VHF AIR BAND TRANSCEIVER

IC-A2

MAINTENANCE MANUAL

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SECTION 1 SPECIFICATIONS

GENERAL

Frequency Range	: 108.000 ~ 135.975MHz (Receive) 118.000 ~ 135.975MHz (Transmit)
Memory Channels	: 10
Channel Spacing	: 12.5kHz, 25kHz or 50kHz
Frequency Stability	: ±0.002% (−20°C ~ +50°C)
Usable Temperature	: −20°C ~ +50°C (−4°F ~ +122°F)
Antenna Impedance	: 50 ohms unbalanced
Power Supply Requirement	: 13.8V DC within +15% or −20% Attendant battery pack, IC-CM7 (negative ground)
Current Drain	: Transmit High : 900mA approx. Low : 600mA approx. Receive Standby : 55mA approx. Max. audio out : 220mA approx.
Dimensions	: 65(74)mm(W) × 196(207)mm(H) × 38(47)mm(D) Bracketed values include projections.
Weight	: 595g including IC-CM7 battery pack

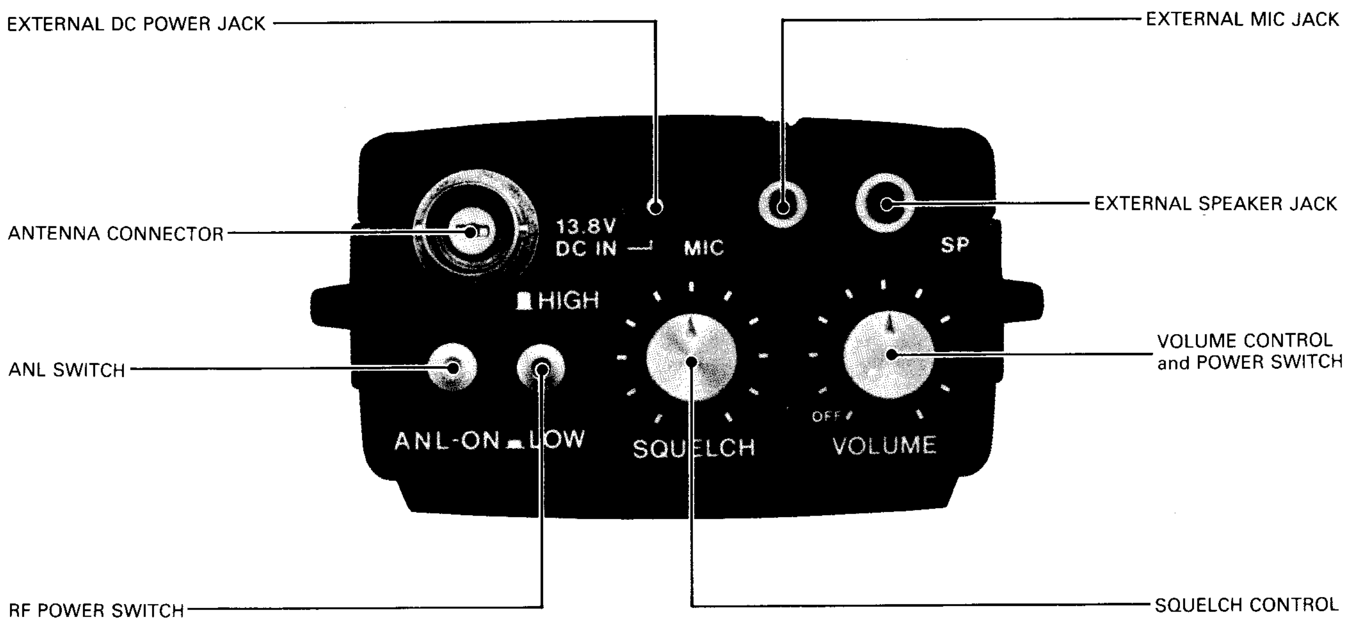
RECEIVER

Receive System	: Double-conversion superheterodyne
Modulation Acceptance	: A3E 6K00 (6A3)
Sensitivity	: Less than 2μV for 6dB S/N with 1kHz, 30% modulation on 108.000 ~ 117.975MHz Less than 1μV for 6dB S/N with 1kHz, 30% modulation on 118.000 ~ 135.975MHz
Squelch Sensitivity	: Less than 0.5μV at threshold point at frequencies higher than 118.000MHz with 1kHz, 30% modulation.
Suprious Response Rejection Ratio	: More than 60dB
Selectivity	: More than 60dB at adjacent channel
Audio Output Power	: More than 500mW at 10% distortion with 8 ohms load
Audio Output Impedance	: 8 ohms

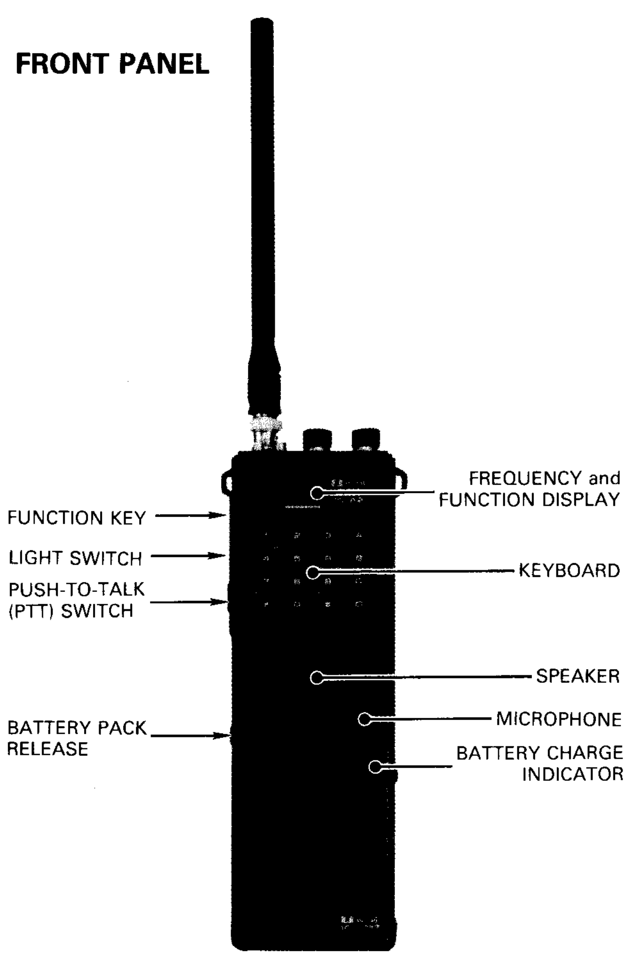
TRANSMITTER

Output Power	: High : 1.5W carrier power (4.8W PEP) Low : 0.5W carrier power (1.6W PEP) Bracketed values show PEP with 80% modulation by 1kHz audio tone.
Emission Mode	: A3E 6K00 (6A3)
Modulation System	: Low level modulation
Suprious Emission	: More than 45dB bellow carrier
Microphone	: Built-in electret condenser microphone

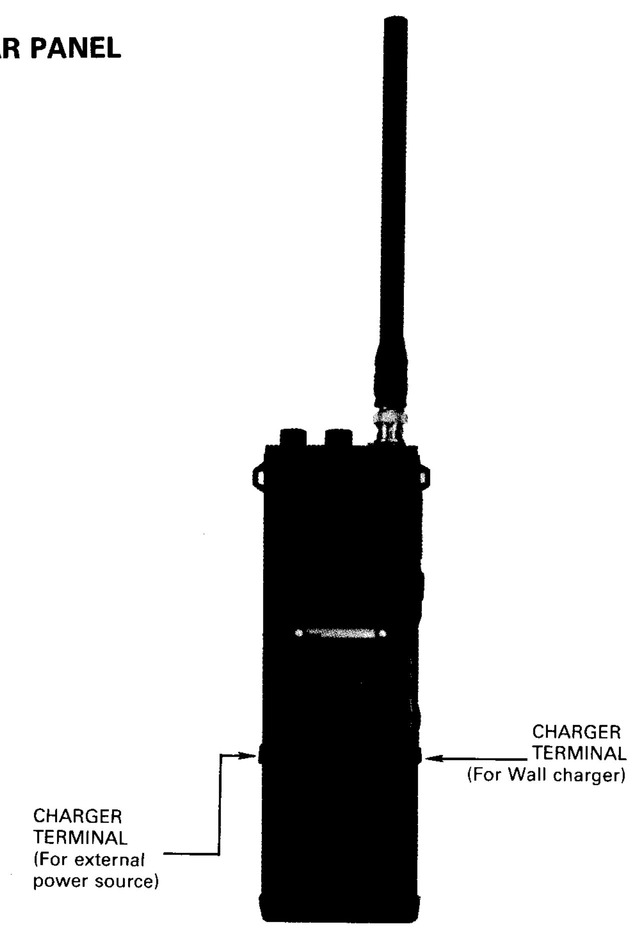
TOP PANEL



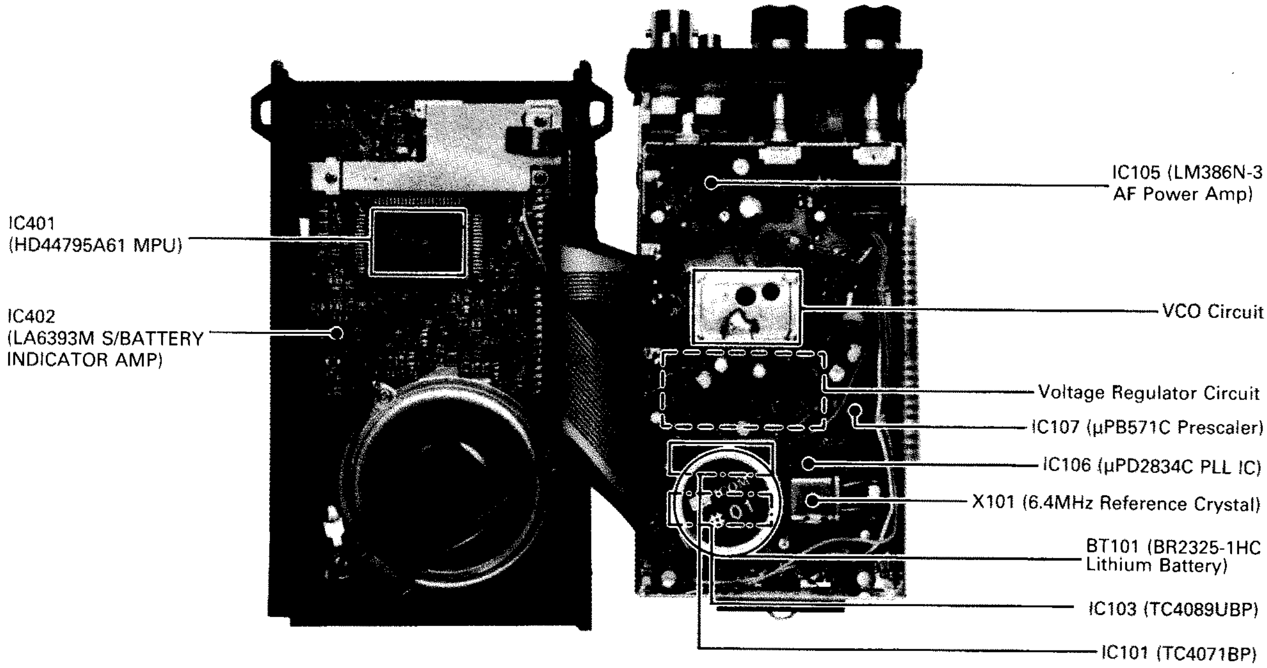
FRONT PANEL



REAR PANEL

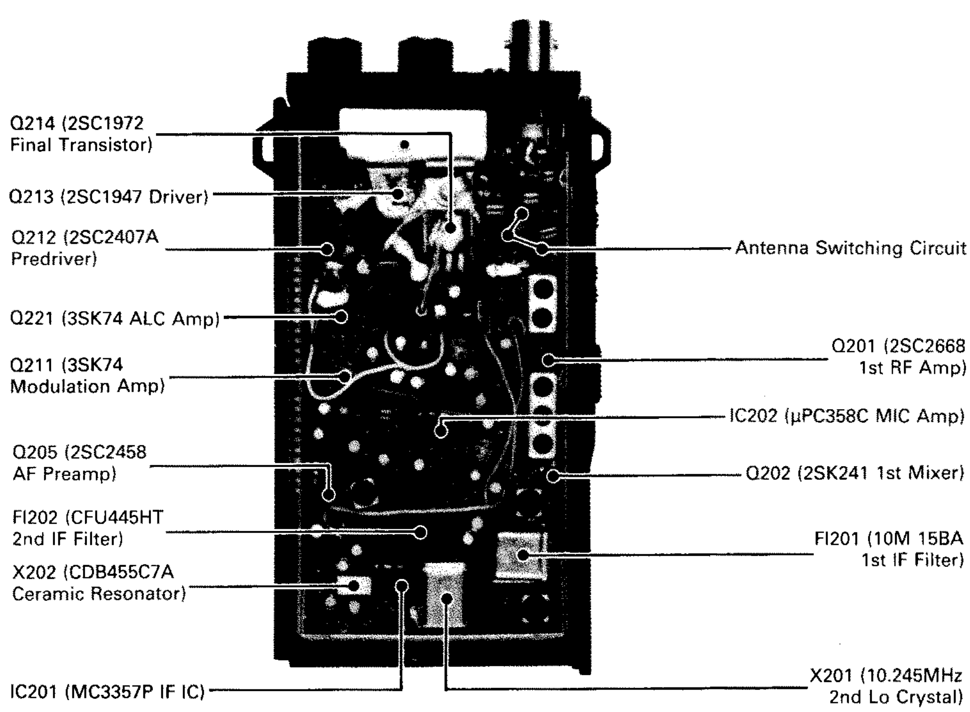


LOGIC/MAIN UNIT

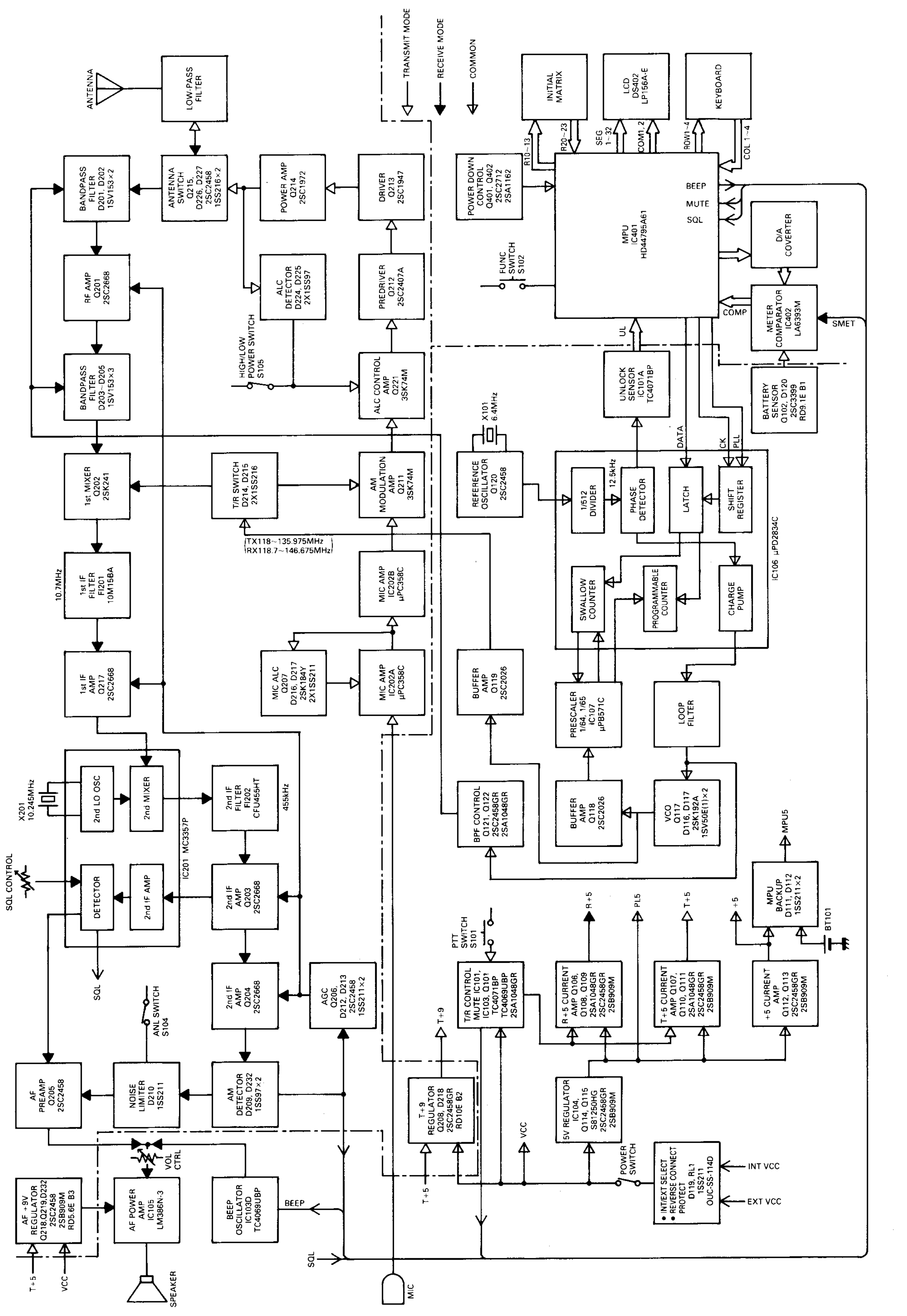


LOGIC UNIT **MAIN UNIT**

PLL UNIT



SECTION 4 BLOCK DIAGRAM



5 - 1 RECEIVER CIRCUITS

5 - 1 - 1 ANTENNA SWITCHING CIRCUIT

Input signals from the antenna connector (J202) are fed into the antenna switching circuit in the RF UNIT through Chebyshev low-pass filters that consist of L225, L226, and C356 to C360.

The antenna switching circuit employs a quarter wave diode switching circuit. In the receive mode, switching diodes D226 and D227 are turned OFF, thus current does not flow. Incoming signals are fed into the RF amplifier circuits through low-pass filters that consist of C353, L224, and C355.

5 - 1 - 2 RF AMPLIFIER CIRCUIT

Signals from the switching circuit pass through bandpass filters that consist of L201, L202, C202, C207, D201, and D202. Passed signals through bandpass filters are fed into Q201 (the first RF amplifier) and are amplified. Output signals from Q201 are again passed through bandpass filters that consist of L203 to L205, C226, and D203 to D205, and are then fed into Q202, the first mixer.

Diodes D201 to D205 are varactor diodes that track the bandpass filters and are controlled by a PLL lock voltage from the MAIN UNIT. These diodes tune the center frequency of the bandpass filters for wide bandwidth reception and good image response rejection. It is possible to receive with less than 60dB spurious rejection as L201 and L202, and L203 to L205, are magnetically coupled.

5 - 1 - 3 FIRST MIXER CIRCUIT

Signals from the bandpass filters are applied to the gate of the first mixer, Q202. Local oscillator signals (118 ~ 146MHz) from the MAIN UNIT are applied to the source of Q202. Q202 converts RF signals into 10.70MHz first IF signals and outputs them at L206.

5 - 1 - 4 IF AMPLIFIER CIRCUIT

First IF signals from L206 are filtered from out-of-band interference by a matched monolithic filter (FI201) and are amplified at Q217. Signals amplified at Q217 are fed into pin 16 of IC201 on the RF UNIT.

IC201 incorporates in one package a local oscillator circuit, a second mixer, a limiter amplifier, an active filter, and a quadrature detector circuit.

A first IF signal enters pin 16 of IC201 and is mixed with a second local oscillator frequency (10.245MHz) generated by crystal X201. A 455kHz second IF signal is then output from pin 3 of IC201. The signal passes through a high-performance ceramic filter (FI202), and is then amplified at Q203 and Q204.

5 - 1 - 5 SQUELCH CIRCUIT

A portion of signals amplified at Q203 is fed into pin 5 of IC201 where it is again amplified by the limiter amplifier. Output signals from the limiter amplifier are then separated. One of the signal enters a quadrature detector circuit inside IC201, and the other one exits from pin 7. The output signal from pin 7 re-enters pin 8 through the ceramic resonator, X202, and then both signals are detected by the quadrature detector circuit inside IC201. The resulting audio signal is output from pin 9.

The output signal from pin 9 is applied to an active filter circuit which consists of R223, R225, C232, C233, and an active filter amplifier inside IC201. The active filter circuit selects noise signals of approximately 20kHz then outputs them from pin 11.

A noise signal is detected by D207 and is then converted to negative DC voltage which decreases the voltage of pin 12 on IC201.

If pin 12 of IC201 is lower than the threshold level, the squelch switch inside IC201 is activated, thus closing the squelch. However, while receiving RF signals, audio noise decreases, causing pin 12 to become higher than the threshold level. This results in the squelch switch being turned OFF. Pin 14 of IC201 is an output port for the squelch switch. This output signal controls the AF preamp circuit (Q205) on the RF UNIT, removing AF signals.

5 - 1 - 6 AF CIRCUIT

A second IF signal amplified at Q204 is detected by D209 and D231, and is converted to an AF signal. The AF signal is passed through Q205 and fed into pin 2 of IC105 on the MAIN UNIT through volume control R118. The speaker is driven by IC105 at more than 500mW of AF output with an 8 ohm load.

The voltage regulator circuit for IC105 consists of Q218, Q219, and D232 on the RF UNIT. IC105 receives approximately 9V of power while receiving. In the transmit mode, the base voltage of Q218 is 0, so Q218 and Q219 are shut OFF, resulting in no voltage being supplied to IC105.

5 - 1 - 7 ANL (NOISE LIMITER) CIRCUIT

The ANL circuit consists of R234, R236, R237, R241, D210 and C263. The detector output from D209 and D231 is applied to the anode of D210 through R237 and R241. The detector output is also applied to the cathode of D210, passing through R234 where it is divided by R234 and R236.

When the ANL SWITCH is OFF, the anode voltage of D210 is higher than the cathode voltage. D210 is therefore activated. However, when the ANL SWITCH is ON, C263 is grounded. Therefore the detector output, including pulses, is only applied to the cathode of D210. The cathode voltage becomes higher than the anode voltage and D210 shuts OFF just at the moment when the pulses are received. The AF signal (excluding pulses) is then passed through D210 and is applied to Q205.

5 - 1 - 8 AGC CIRCUIT

In general, when receiving interference while operating with a very strong adjacent signal, audio output may be distorted since the dynamic range of RF and IF amps is usually limited with regard to input signals. Q206 has therefore been installed in this transceiver for AGC circuit control, providing audio output with less distortion.

When receiving strong signals, the AM detector voltage increases and Q206 is activated. The bias voltages of Q201 and Q217 then decrease as they are divided by R248, R249, and R250. The bias voltages of Q203, Q204, and IC201 also decrease as they are divided by R245, R246, and R247. Total gains are therefore decreased and protected from distortion.

5 - 2 TRANSMITTER CIRCUITS

5 - 2 - 1 MIC AMPLIFIER CIRCUIT

Audio signals from the microphone are fed into pin 3 of IC202A on the RF UNIT through R260. R260 adjusts the microphone input level. Output signals are fed into IC202B, a buffer amplifier, through R270 where signal modulation is adjusted.

A portion of the output signals from IC202A is detected by D216 and D217, and then acquires a minus voltages. The voltage level controls the output gain of IC202A through Q207.

Normally, the output gain of IC202A is approxmately 14dB and is fixed by using R267, R268 and the resistance between the drain and source of Q207. When output signals from IC202A are too strong, the resistance of Q207 is decreased and the output gain of IC202A is reduced.

5 - 2 - 2 MODULATION AND BUFFER AMPLIFIER CIRCUITS

A local oscillator signal comes from the MAIN UNIT through D215, R253, R254, and R255. The level of this signal is approximately 0dBm. It is fed into gate 1 of Q211. An output signal from IC202B is fed into gate 2 of Q211 and is mixed with the local oscillator signal. An output signal from Q211 is approximately 0dBm when the input signal from gate 2 of Q211 is moderated.

An output signal from Q211 is fed into ALC Amp Q221 and then is amplified at Q212 and Q213 to a maximum level of approximately 30dBm (1W PEP). An amplified circuit is connected by a troidal coil which acts as a matching transformer. No adjustment is therefore necessary for stability of operation between 118MHz and 136MHz.

5 - 2 - 3 POWER AMPLIFIER CIRCUIT

Q214 is a final transistor and has a maximum output level of 37.8dBm (6W PEP) between 118 and 136MHz with 30dBm of drive power from Q213. When the transceiver is operating in transmit mode, Q215, D226, and D227 are activated, making C353, L224, and C355 parallel resonance circuits. The result is that no signal is then fed into the receiver circuit.

5 - 2 - 4 ALC CIRCUIT

The ALC detector circuit consists of D224, D225, L222, R297, R298, and C345 through C350. Output voltage of the detector is about 1V when the antenna impedance is matched at 50 ohms.

However, when the antenna impedance is in a mismatched condition, the detector voltage becomes higher than it would be if the antenna were matched. This detector voltage is applied to ALC Amp Q221 for reducing output power.

In addition, the ALC circuit includes an output power set circuit. Trimmer resistor potentiometer R282 (power set) controls feedback voltage from the ALC detector circuit entering gate 1 of Q221.

5 - 3 PLL (PHASE LOCKED LOOP) CIRCUITS

The PLL is designed in a way that allows the desired frequency to be generated directly by the VCO, adopting a dual modulous prescaler system. The PLL consists of a prescaler, IC107, and PLL IC, IC106. It is fed "devided by N-data" from the MPU which determines the operating frequency.

N-data is determined by dividing the desired frequency by the reference frequency. Desired frequecny is the transmit frequency in the transmit mode and the first local oscillator frequency in the receive mode.

$$N = \frac{\text{Desired frequecny}}{\text{Reference frequecny}}$$

The signal from the VCO is buffer amplified at Q118 and is then divided N times at IC107. The divided signal at IC107 is fed into pin 4 of IC106. The signal inside IC106 is phase deteced and the lock voltage is then output from pin 11 of IC106. The output voltage is applied to varactor diodes D116 and D117 in the VCO circuit through a loop filter. This lock voltage controls the VCO frequency. Due to a non-multiplying, mixing circuitry, the circuit constitution is simple and reduces spuriousness.

5 - 3 - 1 DUAL MODULUS PRESCALER

IC107 is a dual modulus prescaler that divides signals 1/64 or 1/65. IC106 is a CMOS LSI used in the PLL as a frequency synthesizer. It incorporates a swallow counter of 6 binary bits, a programmable counter of 11 binary bits, a phase comparator, a charge pump, and a frequency divider for the reference frequency.

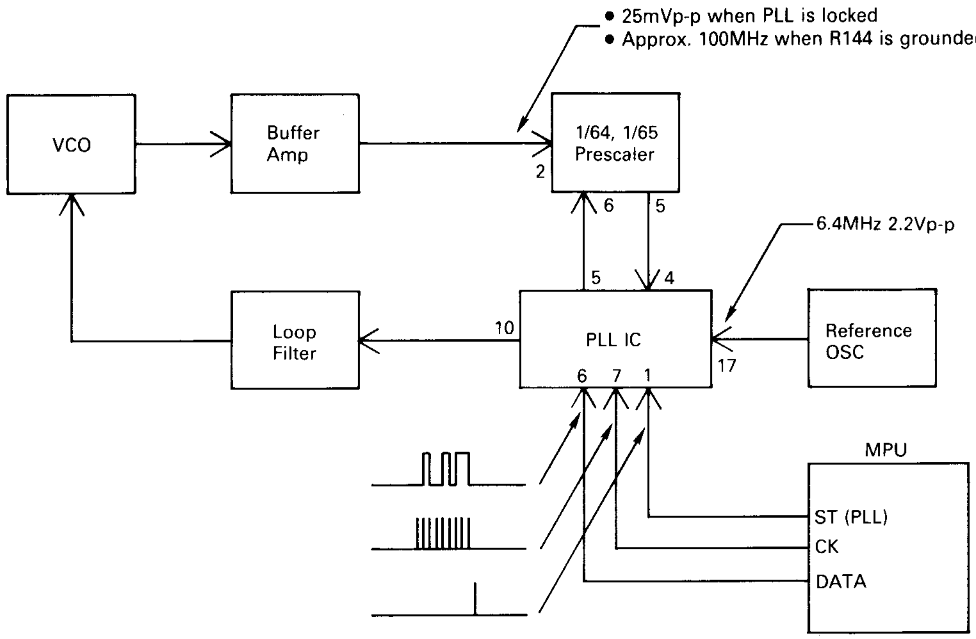


Fig. 5-1 PLL BLOCK DIAGRAM

The reference frequency is generated by crystal oscillator Q120 and crystal unit X101, and is fed into pin 17 of IC106. IC106 divides the frequency by 1/512. The reference frequency then becomes 12.5kHz and is fed into pin 8 of IC106.

5 - 3 - 2 UNLOCK CIRCUIT

When the PLL is unlocked, pin 10 of IC106 is "LOW". This LOW level voltage is then applied to pin 13 of IC101A through the time constant circuit, R143 and C141. As R+5V is applied to pin 12 of IC101A, pin 11 of IC101A is "HIGH" in the receive mode. When pin 13 of IC101A is "LOW" in the transmit mode, pin 11 will also be "LOW". This results in unlocked information from the PLL being fed into the MPU that the PLL has unlocked, preventing unwanted signals from being transmitted.

5 - 3 - 3 LOOP FILTER AND VCO CIRCUIT

Output from pin 11 of IC106 determines the characteristics of the PLL through a lag-lead type loop filter made up of R144, R145, and C142. This output signal controls varactor diodes D116 and D117 through integrating circuit R146 and C143.

The VCO employs a Hartley oscillator circuit. This oscillator circuit has no shift circuit, so the lock voltage, which comes from N-data, controls all the frequency range. The VCO oscillates between 118 and 136MHz in the receive mode and between 118.7 and 146.7MHz in the transmit mode. An output signal from the VCO is amplified at Q118 and Q119 and is applied to the RF UNIT.

5 - 4 POWER SUPPLY CIRCUITS

5 - 4 - 1 INTERNAL/EXTERNAL POWER SUPPLY SWITCHING CIRCUIT

When using a battery pack, RL101 is OFF. When an external DC power source having 10 to 16V is connected to the EXTERNAL DC POWER JACK on the top panel [13.8V DC IN], RL101 will be activated. The transceiver will then be operated by an external power source.

If an incorrect connection to the EXTERNAL DC POWER JACK (such as reversing polarities) is made, D119 will be affected, reversing its bias and preventing RL101 from being activated.

5 - 4 - 2 VOLTAGE REGULATOR CIRCUIT

In the voltage regulator circuit, a CMOS three-terminal regulator (IC104) is used. This keeps the output voltage constantly at 5V.

Noise components are eliminated from the output of IC104 through filter circuit R139 and C134. Output after noise components have been eliminated is fed into the current amplifier circuit which consists of Q114 and Q115.

Q114 and Q115 are connected in a complementary circuit in order to acquire a higher current amplification factor. Accordingly, the base of Q114 is nearly equal voltage to the output voltage of IC104. Also, the collector voltage of Q115 is approximately 5V. As the temperature coefficient of the junction voltage of D113 is nearly equal to the V_{BE} of Q114, the output voltage is kept constant against temperature changes.

A regulated voltage of 5V at Q115 is fed into a common circuit through currrent amplifier circuit Q112 and Q113. This voltage is also fed into the transmit/receive switching circuit of Q106 and Q107, supplying the PLL circuit through L102.

In the receive mode, pin 9 of IC103 is "LOW" therefore Q106 is activated to supply R+5V through current amplifier circuit Q108 and Q109. Q107 will be switched OFF at this time.

In the transmit mode, pin 9 of IC103 is "HIGH" and pin 8 of IC103 is "LOW". Consequently, Q106 is OFF and Q107 is ON. Q107 supplies T+5V through current amplifiers Q110 and Q111.

5 - 4 - 3 POWER SOURCE CIRCUIT FOR THE MPU

The MPU includes memory elements for memory operating frequencies, memory channels, etc. Usually memories will be erased when the power source of the MPU fails. In order to avoid this, the memory unit has an internal lithium battery for memory backup when the power source is turned OFF.

5 - 4 - 4 VOX POWER SOURCE CIRCUIT

This is a current limiter that supplies a voltage to the external VOX UNIT, HS-10SA. Current drain of up to 5mA is acceptable. In the case of a normal load current, the voltage drop through R299 is small, approximately 5V, and is fed into the VOX UNIT. The increase in load current leads to the increase in the voltage drop at R299. The voltage is obtained by adding the voltages between R300 and cathode of D228, which limit the load current.

5 - 5 LOGIC CIRCUITS

The main part of the LOGIC CIRCUITS is a one-chip microcomputer, IC401, which includes a 2K-words ROM, a 128-word pattern ROM, and a 160-bit RAM and drive circuit for the LCD (Liquid Crystal Display).

Following is an explanation of operations related to I/O ports.

5 - 5 - 1 D0 (PIN 78) SEND

This is an input port and is pulled up inside the MPU. When this port is "LOW" the transmit mode is selected and input from the KEY entry is inhibited. At each leading and trailing edge the MPU outputs frequency control data and makes MUTE processing when receiving an unlock signal.

5 - 5 - 2 D1 (PIN 79) MUTE

This is an output port and will be "HIGH" for approximately 60 milliseconds when changing from the receive to transmit mode. When the frequency is between 108MHz and 117.9875MHz in the transmit mode this port remains "HIGH".

5 - 5 - 3 D2 (PIN 80) CK

This port outputs clock pulses for serial data, transferring them simultaneously with N-data for the PLL. The serial data are converted into parallel data by a shift register inside the PLL IC. This shift register shifts the data at the leading edges of the clock pulses.

5 - 5 - 4 D3 (PIN1) DATA

This is an output port where PLL N-data are output serially. The serial data transferring begins with the most significant bit (MSB) and ends with the least significant bit (LSB). N-data for PLL are transferred in binary code. For 118MHz, 24E0 (Hexadecimall of 118.000 / 12.5 = 9440) is output. (See the diagram below.)

5 - 5 - 5 D4 (PIN 2) COMP

This is an input port and is pulled up inside the MPU. This port is active at "LOW". When the port is "LOW", the MPU sends the count number of the output at the R3 port to the S/BATTERY INDICATOR in the LCD. This port has priority over the SQL port (pin 6) in the MPU operation.

5 - 5 - 6 D5 (PIN 3) UNLOCK

This is an input port and is pulled up inside the MPU. This port is active at "LOW". When the port is "LOW", the MPU converts D1 port to "LOW" and makes all the DISPLAY indicators flash continuously.

5 - 5 - 7 D6 (PIN 4) PLL

This is an output port that outputs a strobe pulse after PLL N-data have been transferred. The PLL IC reads the N-data from the shift register (inside the PLL IC) at the leading edge and attaches it to the trailing edge of the pulse.

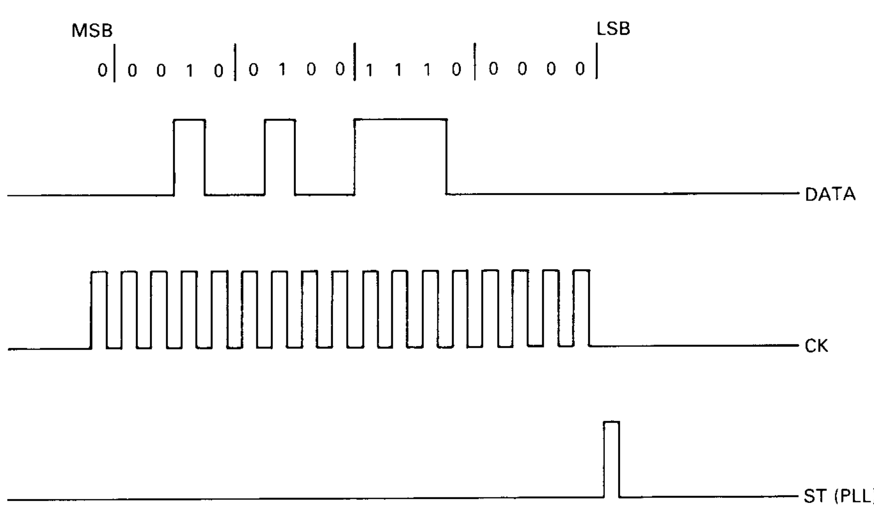


Fig. 5-2 DATA CONSTRUCTION

5 - 5 - 8 D8 (PIN 6) SQL

This is an input port and is pulled up inside the MPU. When the pin is "LOW", the MPU indicates two dots at the left of the LCD S/Battery indicator. At this time the MPU stops the program scan or memory scan if either of them are operating.

5 - 5 - 9 D9 (PIN 7) HALT COUNT

This is an output port which is "LOW" for a moment to store the program execution address of the MPU when the transceiver is turned OFF.

5 - 5 - 10 D10 (PIN 8) BEEP

This is an output port that outputs a HIGH level signal 40 milliseconds after receiving key information that controls the BEEP tone oscillator on the MAIN UNIT.

5 - 5 - 11 D11 (PIN 9) FUNC

This is an input port and is pulled up inside the MPU. When the funciton key is pressed, this pin is "LOW" and the secondary functions on the keyboard can be selected.

5 - 5 - 12 D12 ~ D15 (PINS 10 ~ 13) KEY SCAN

These are output ports consisting of four lines with each terminal an open drain. These lines are connected to the columns of the keyboard and each line is turned ON sequentially.

5 - 5 - 13 R0 (PINS 14 ~ 17) KEY RETURN

These are input ports consisting of four lines and each teminal is pulled up by R414 ~ R417. These lines are connected to the row of the keyboard for receiving the KEY SCAN signal, locating the pressed keys.

5 - 5 - 14 R1 (PINS 66 ~ 69) INITIAL KEY RETUREN

These are input ports consisting of four lines and each terminal is pulled up inside the MPU. Each line is active at a low level and connects to the matrix circuit which determines frequency range, channel step, etc.

5 - 5 - 15 R2 (PINS 70 ~ 73) INITIAL KEY SCAN

These are output ports consisting of four lines with each terminal an open drain. These lines are connected to the matrix circuit.

5 - 5 - 16 R3 (PINS 74 ~ 77) D/A

This is an output port consisting of four lines and outputs a loop counter number as a hexadecimal. This number increases every time when the MPU program has executed its main routine. When the COMP terminal is "LOW" the counter is cleared and starts again.

This output is a converted DC voltage, converted by R409 ~ R412 which make up the D/A converter. When the output voltage becomes greater than the S-indicator or Battery-indicator voltage, the COMP terminal becomes "LOW".

5 - 5 - 17 INT 0 (PIN 64) POWER DOWN

This is an input port and is pulled up by R405 and R406 outside the MPU. This port is active at "LOW". When the transceiver is turned OFF or the power supply voltage decreases, the MPU activates the transceiver backup procedure and the $\overline{HLT}$ terminal is set in the HALT state.

5 - 5 - 18 RESET (PIN 18)

This is a terminal for resetting the MPU and is pulled down by R421. This port is active at "HIGH". When S102 (function switch) on the MAIN UNIT is pressed while the power switch is ON, Q403 is activated. Therefore, a pulse which comes from an $\overline{HLT}$ port through C406 and R422 (differential circuit) and Q403 is applied to the RESET port. Thus this port receives a pulse and the MPU is reset.

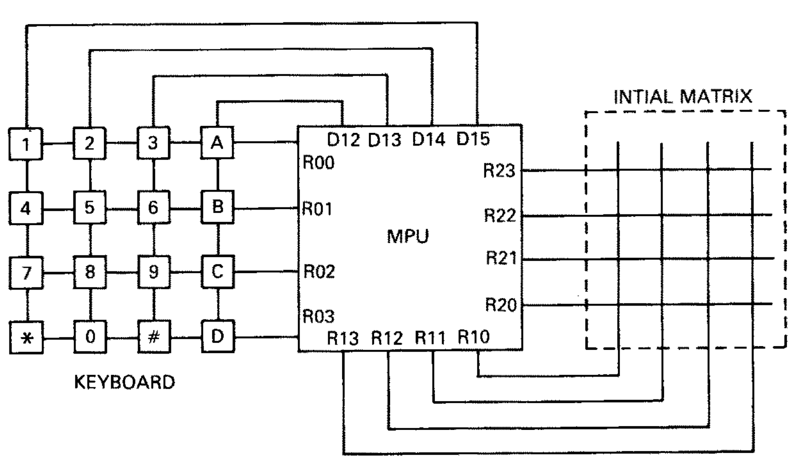


Fig. 5-3 KEYBOARD AND INITIAL MATRIX

5 - 5 - 19 COM 1 and 2, SEG 1 ~ 32 (PINS 27, 28, 31 ~ 62)

These are output terminals for driving the LCD. Segments on the LCD are displayed with 1/2 bias and 1/2 duty conditions. The LCD is driven at 3V. The bias voltage is generated by R418, R419, and R404 between Vcc and V1 and between V2 and V3 inside the MPU.

5 - 5 - 20 OSC1, OSC2 (PINS 20 and 21)

These are teminals for the MPU clock oscillator. Clock frequency is determined at approximately 200kHz by R413.

5 - 6 OTHER CIRCUITS

5 - 6 - 1 LAMP CIRCUIT

The lamp circuit is created by Q116, D114, and D115. These transistors drive the lamp at a constant current and brightness is not changed with different power supply voltages (Vcc).

When S103 is pressed, current flows into R141, resulting in a Q116 base voltage of approximately Vcc−1.2V. This voltage is determined by D114 and D115. Accordingly, the emitter voltage of Q116 will be Vcc−0.6V and the voltage at both ends of R142 will be constant with a Vcc charge.

5 - 6 - 2 BEEP CIRCUIT

This is a phase-shift oscillator made up by IC103D, R134 ~ R136, and C122 ~ C124. It oscillates when a HIGH level voltage is applied to the cathode of D110. The oscillating frequency is set at approximately 2500Hz.

5 - 6 - 3 TRANSMIT/RECEIVE SWITCHING CIRCUIT

When S101 is pressed ON, Q101 is activated, setting pin 13 of IC103A and pin 1 of IC103B are "HIGH". Pin 6 of IC101C will be "LOW" approximately 20 milliseconds after S101 is pressed, due to the time constant circuit (R125 and C116). The mute signal from the MPU remains "HIGH" for approximately 60 milliseconds. Accordingly, pin 9 of IC101D will be "LOW" approximately 60 milliseconds after S101 is pressed.
When S101 is released, Q101 shuts OFF and pin 13 of IC103A and pin 1 of IC101B are "LOW".

Pin 3 of IC101B will be "LOW" approximately 20 milliseconds after Q106 is shut OFF. This is caused by R125 and C116, time constants. The R+5 line is then 5V and the T+5 line is 0V. Pin 12 of IC103A will be "HIGH" level to indicate that the transceiver is in the MPU receive mode.

5 - 6 - 4 BATTERY CHECK INDICATOR CIRCUIT

Power supply voltage (Vcc) is supplied to the cathode of D120, a 9V zener diode. When the voltage exceeds 9V, D120 is ON, and Vcc−9V is applied to the Battery indicator through R108, a trimmer resistor for setting the bar meter.

When in the receiving mode, the base of Q102 is "HIGH" via R+5 and the collector is "LOW". Only the Battery indicator voltage is then applied to the comparator circuit on the LOGIC UNIT.

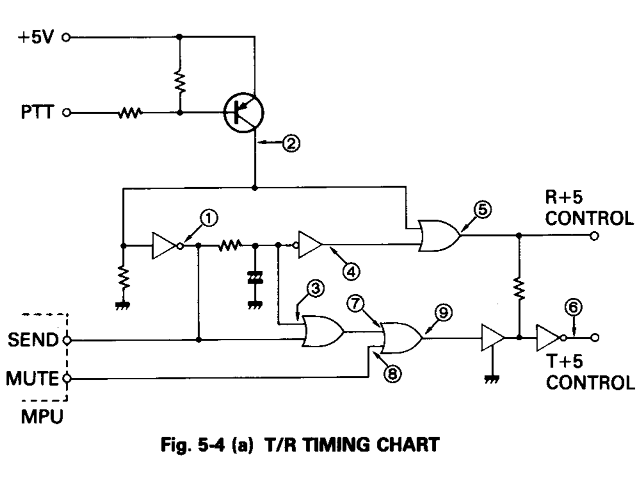


Fig. 5-4 (a) T/R TIMING CHART

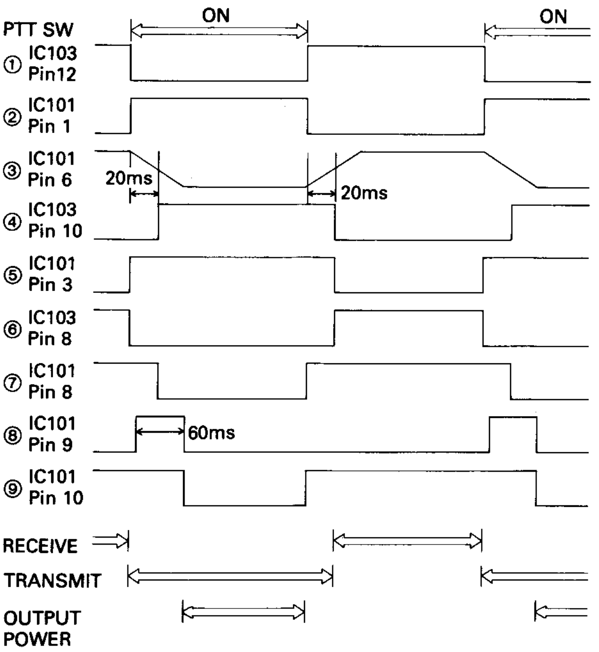
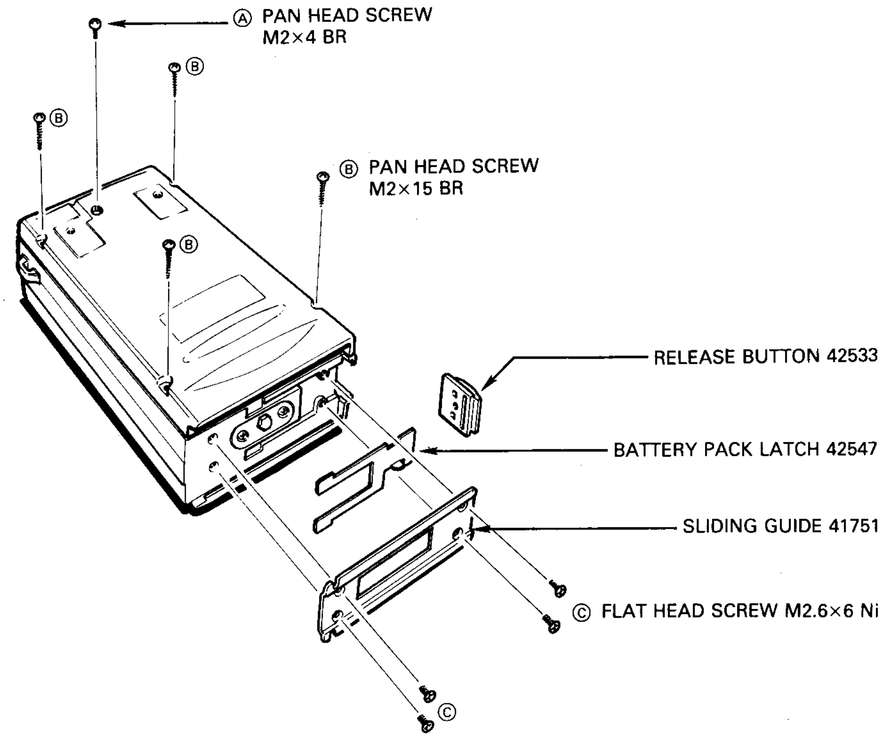


Fig. 5-4 (b) T/R TIMING CHART

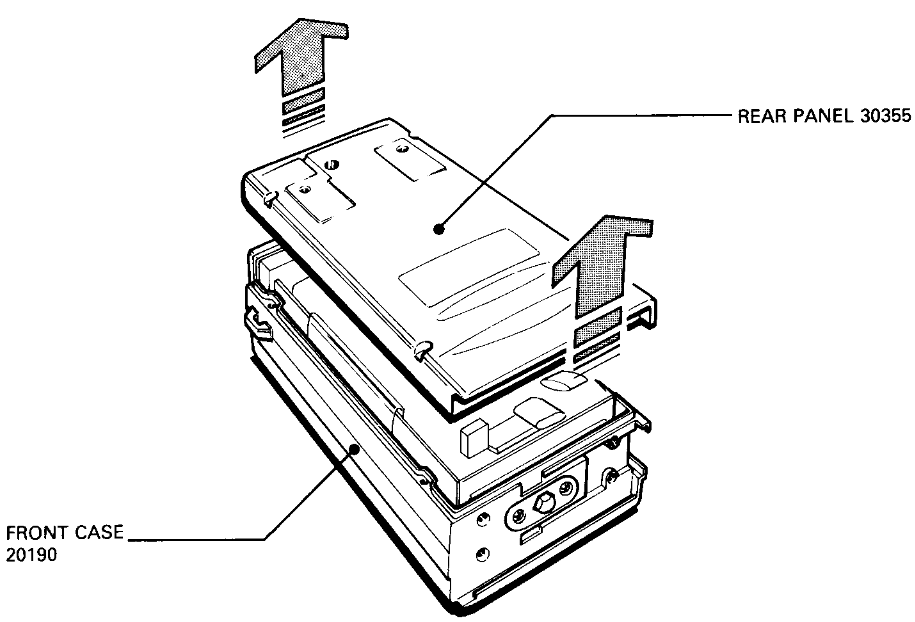
6 - 1 DISASSEMBLY OF THE CASE

1. Turn the POWER SWITCH OFF and remove the battery pack.

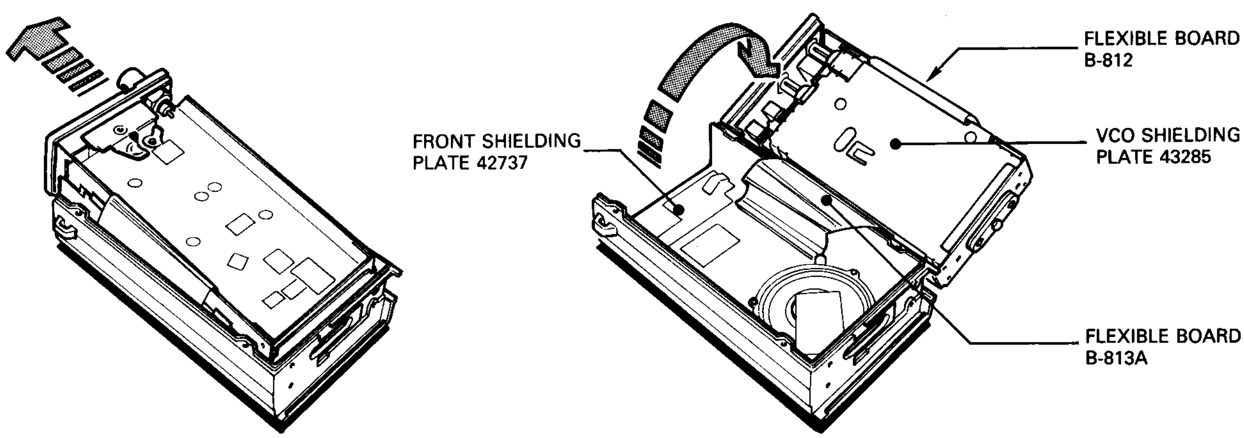
2. Remove screw Ⓐ and the four screws Ⓑ on the rear panel and the four screws Ⓒ on the bottom as shown in the figure.



3. Remove the rear panel as shown in the figure.

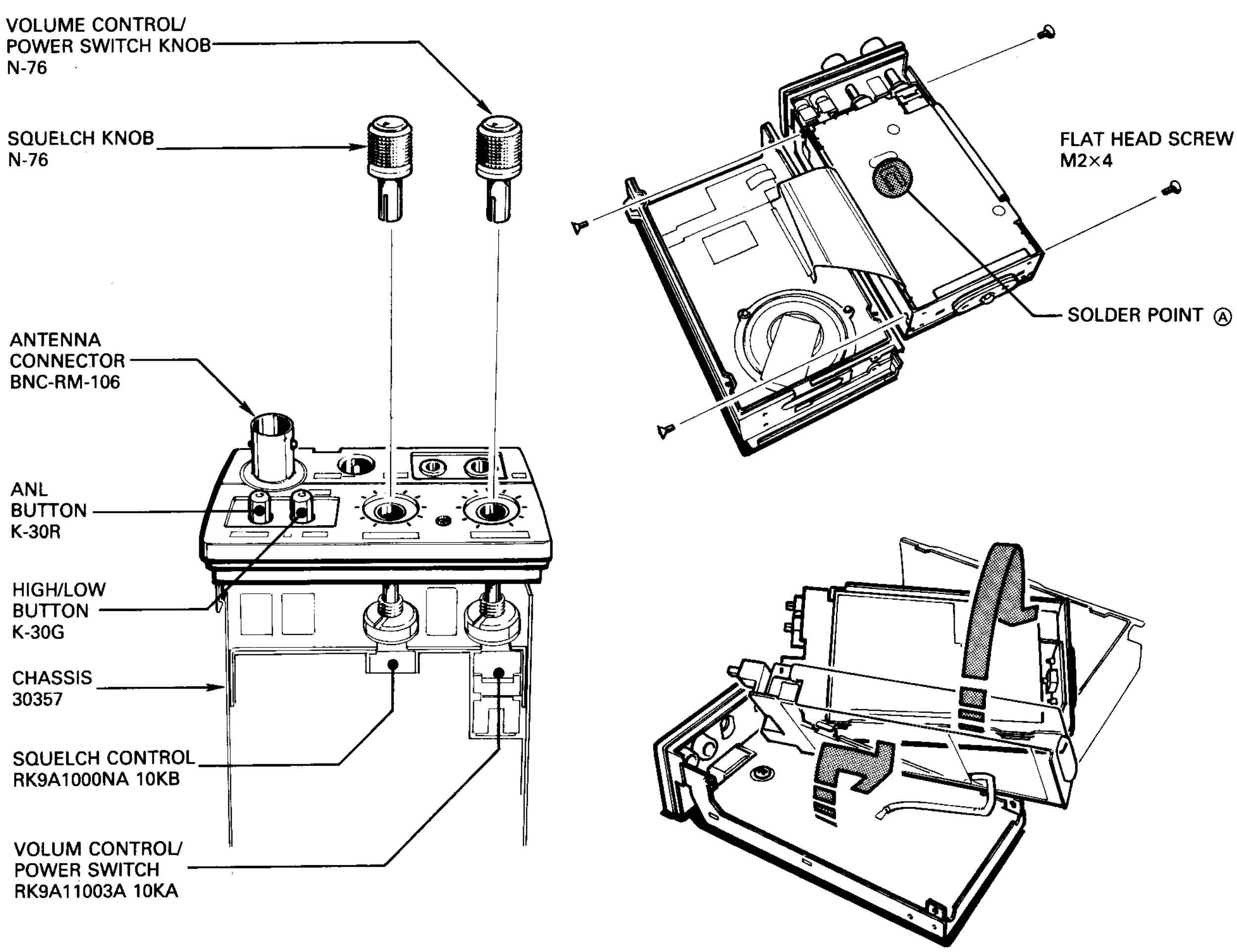


4. Slide the inner frame upward slightly as shown in the figure, and lift the frame away from the front cover. At this time, be careful not to damage the flexible board.



5. Unsolder solderpoint Ⓐ to remove the shielding plate.

6. To open the chassis, remove the two knobs on the top panel (VOLUME and SQUELCH) and press IN the MONITOR and HIGH/LOW buttons. After unscrewing the four screws on the sides of the chassis, open the chassis as shown in the figure.



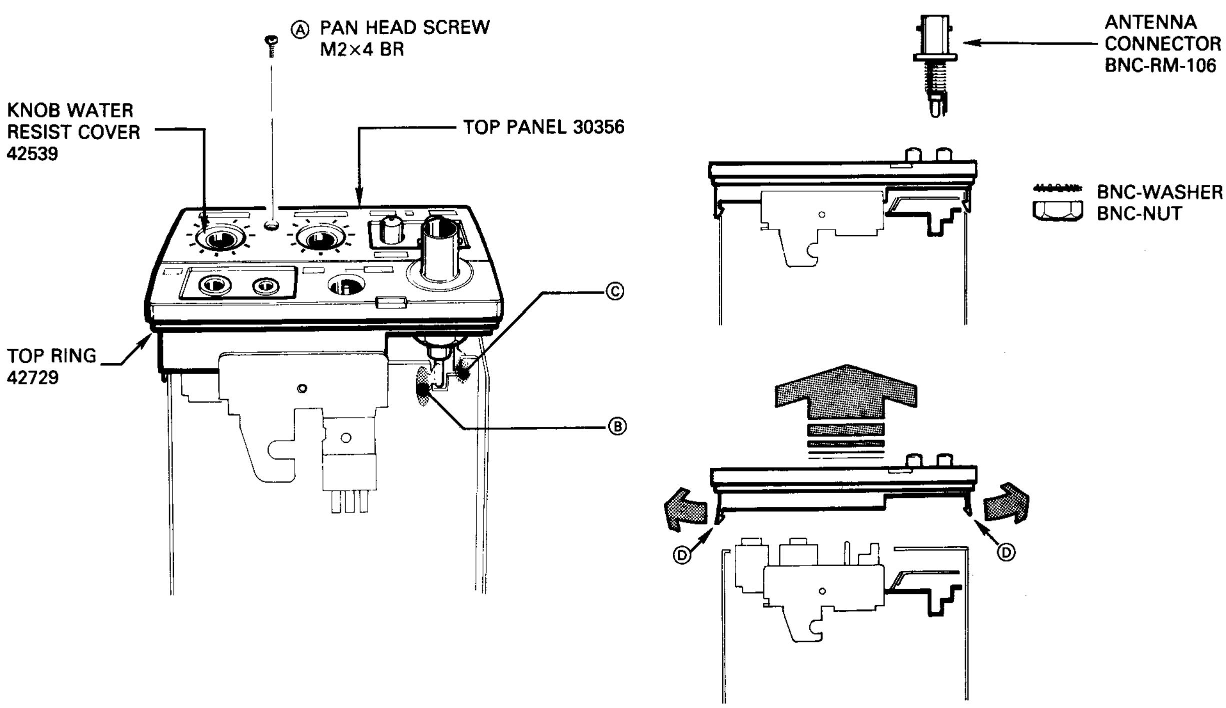
6 - 2 DISASSEMBLY OF THE TOP PANEL

1. Remove the screw Ⓐ.

2. Remove the BNC-NUT and the BNC-WASHER.

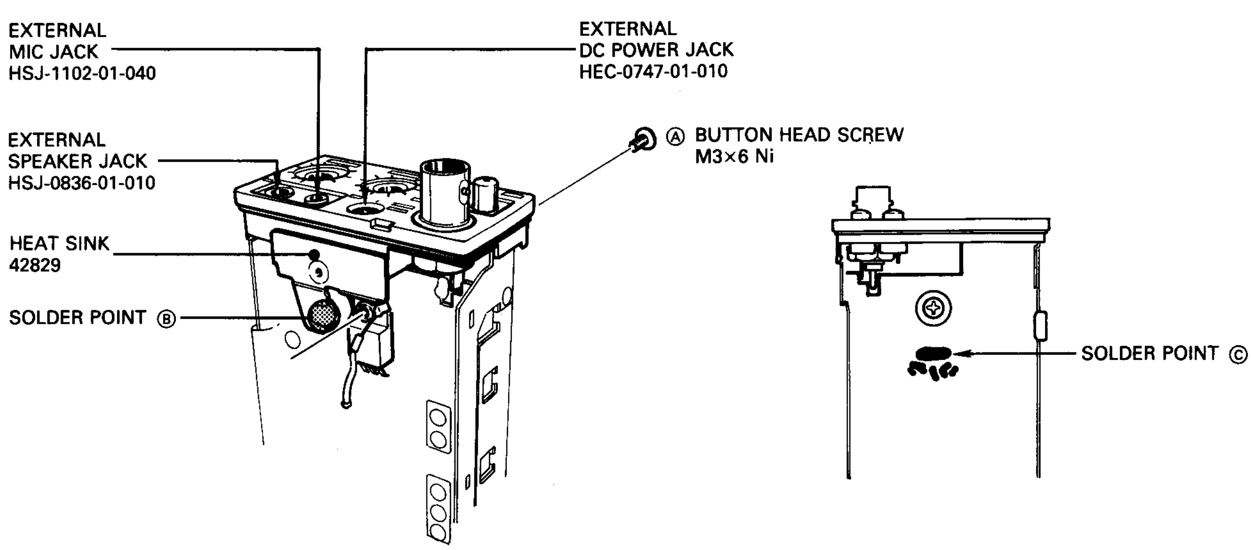
3. Remove the ANTENNA CONNECTOR by unsoldering point Ⓑ on the parts side and point Ⓒ on the soldering side of the RF board.

4. Remove the TOP PANEL by slightly prying outward on both sides tabs (points Ⓓ) of the TOP PANEL.
   See the diagram below. Be careful not to break the tabs.

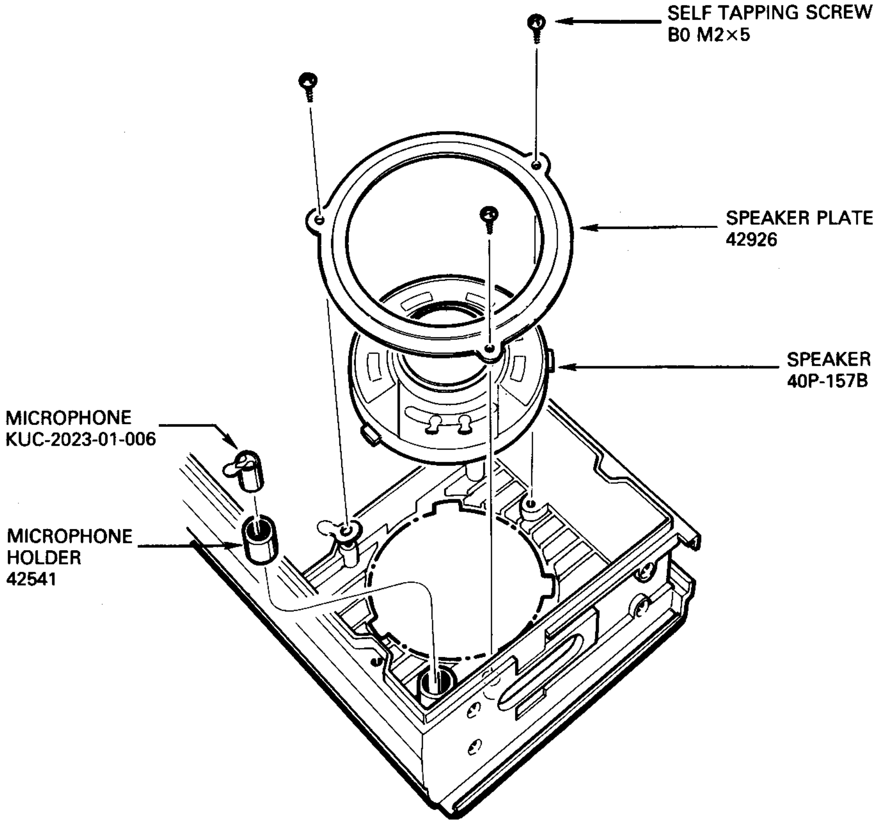


6 - 3 PA AND EXTERNAL JACK ASSEMBLY (HOW TO REPLACE THE DRIVE AND FINAL TRANSISTORS)

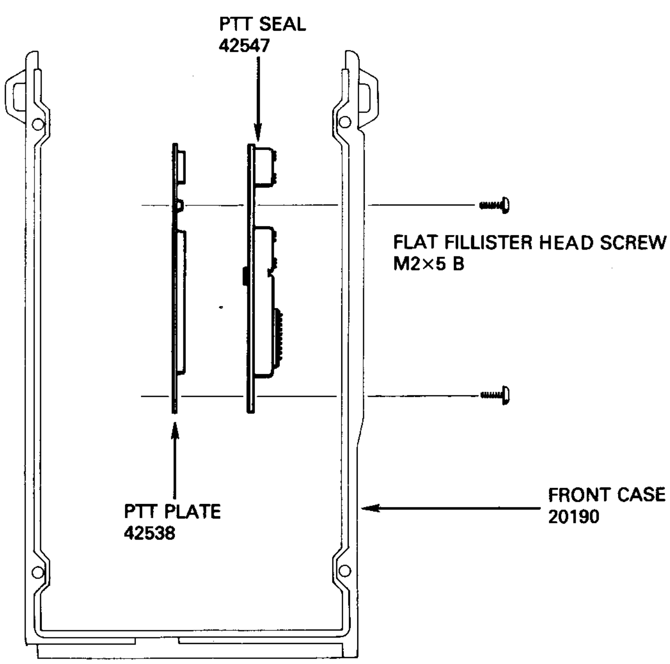
1. To remove the heat sink unscrew and remove the screw Ⓐ and unsolder solder point Ⓑ on the RF unit and solder point Ⓒ on the MAIN unit soldering side.



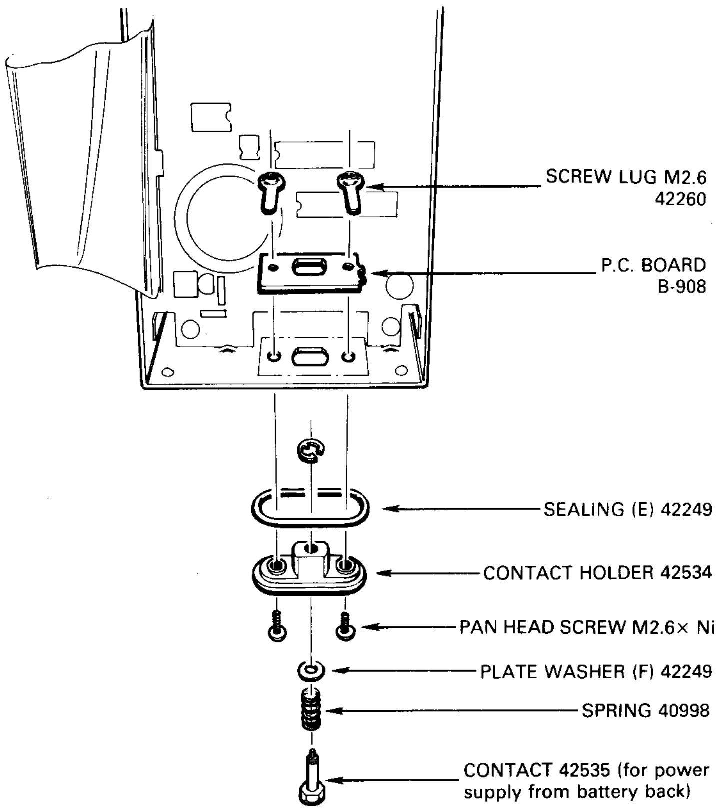
6 - 4 SPEAKER AND MICROPHONE ASSEMBLY (HOW TO REPLACE THE SPEAKER AND MICROPHONE)

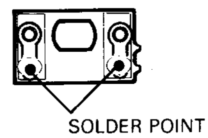


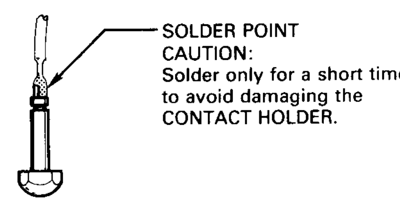
6 - 5 PTT SPRING ASSEMBLY (HOW TO REPLACE PTT SPRING)



6 - 6 UNIT BOTTOM ASSEMBLY







SECTION 7 MAINTENANCE AND ADJUSTMENT

7 - 1 PREPARATION BEFORE SERVICING

1. Detach the power cord and turn OFF the power switch before performing any work on the transceiver.

2. Do not short circuit components while making adjustments.

3. Use an insulated tuning tool for all adjustments.

4. Do not force any of the variable components. Tune them slowly and smoothly.

5. Follow the instructions exactly. If an indicated result is not obtained, repeat the instruction until the correct result is obtained.

6. Check the condition of connectors, solder joints and screws when adjustments are complete. Confirm that components do not touch each other.

7. There are several versions of this transceiver. Adjustment procedures and results may differ for each version. Be certain to follow the correct procedure for the transceiver you have.

8. Confirm defective operation of the transceiver first when checking an out-of-service unit. Verify that external sources do not cause the problem.

9. Use the correct tools and test equipment.

10. Remove the transceiver case as shown on Page 6-1.
    NOTE: Do not damage the flexible printed circuit when removing the case.

11. Remove the four screws to open the hinged chassis as shown on Page 6-2.

12. For transmission problems, attach a dummy load to the antenna connector. For reception problems, attach an antenna or signal generator to the antenna connector. Do not transmit into the signal generator.

13. Recheck for the suspected malfunction with the power switch on.

14. Check the defective circuit. Measure the DC voltages of the collector, base and emitter of each transistor.

15. It is convenient to short circuit an accessory mic connector plug and insert it into the microphone jack when troubleshooting the transmitter.

7 - 2 POWER SUPPLY CHECKS

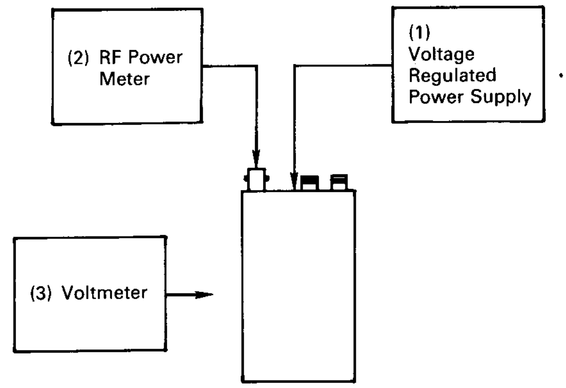
INSTRUMENTS REQUIRED

(1) VOLTAGE REGULATED POWER SUPPLY
- OUTPUT VOLTAGE: DC 13.8V
- CURRENT CAPACITY: 2A

(2) RF POWER METER (TERMINATED TYPE)
- MEASURING RANGE: 0 ~ 5W
- FREQUENCY MINIMUM: AT LEAST 136MHz
- IMPEDANCE: 50 Ω
- SWR: LESS THAN 1:1.2

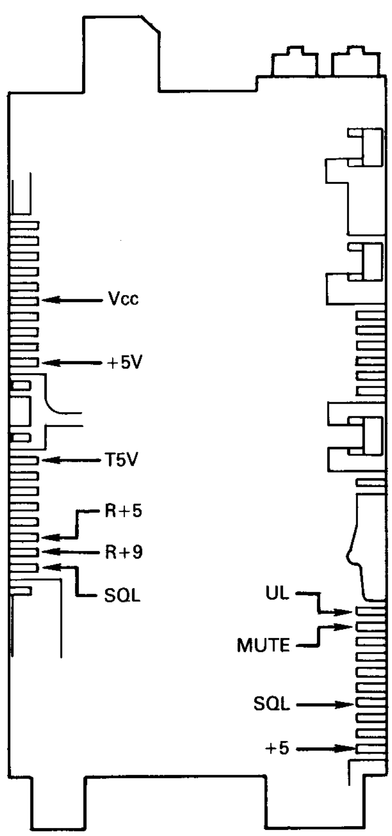
(3) VOLTMETER
- INPUT IMPEDANCE: 50 kΩ/V DC OR BETTER

CONNECTIONS



ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT UNIT	MEASUREMENT LOCATION	VALUE	ADJUSTMENT POINT UNIT	ADJUSTMENT POINT ADJUST
Vcc	1	• Receive mode	MAIN	See diagram below	13.8V		Verify
+5V	1	• Receive mode	MAIN	See diagram below	5V		Verify
R+5	1	• Receive mode	MAIN	See diagram below	5V		Verify
R9V	1	• Receive mode	MAIN	See diagram below	5V		Verify
T+5	1	• Transmit mode	MAIN	See diagram below	5V		Verify
MUTE	1	• Receive mode	MAIN	See diagram below	0V		Verify
UL	1	• Receive mode	MAIN	See diagram below	Approx. 5V		Verify
SQL	1	• Receive mode • Squelch: open	MAIN	See diagram below	5V		Verify
	2	• Squelch: closed			0V		Verify

MAIN UNIT (SOLDERING SIDE)



7 - 3 PLL ADJUSTMENT

INSTRUMENTS REQUIRED

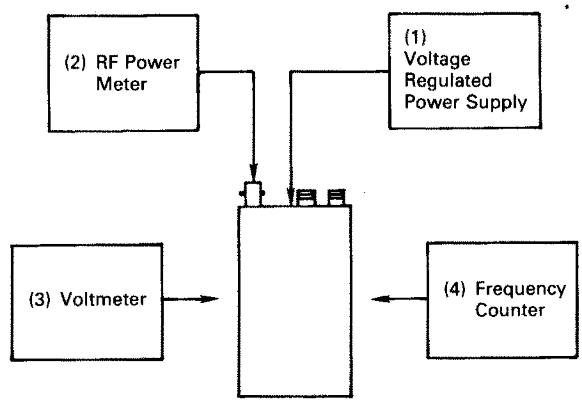
(1) VOLTAGE REGULATED POWER SUPPLY
- OUTPUT VOLTAGE: DC 13.8V
- CURRENT CAPACITY: 2A

(2) RF POWER METER (TERMINATED TYPE)
- MEASURING RANGE: 0 ~ 5W
- FREQUENCY MINIMUM: AT LEAST 136MHz
- IMPEDANCE: 50 Ω
- SWR: LESS THAN 1:1.2

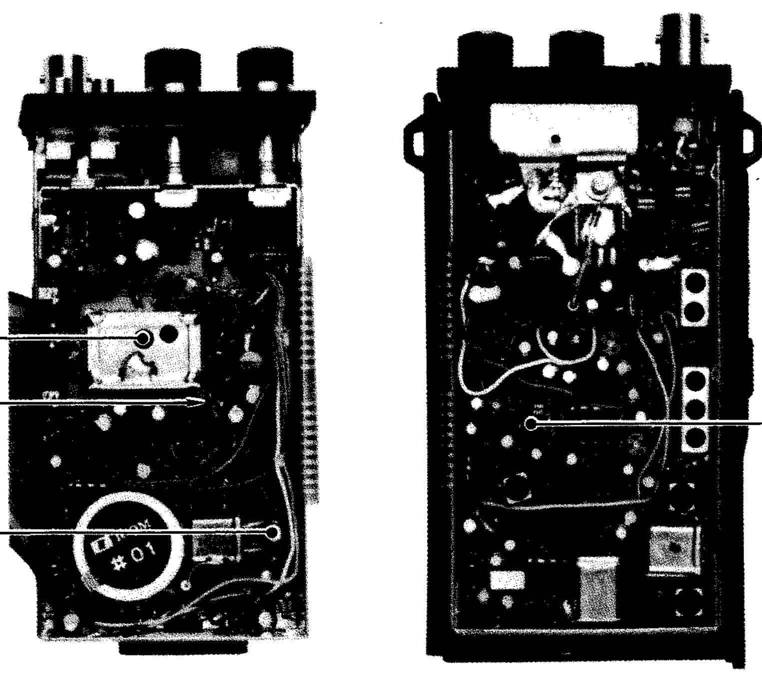
(3) VOLTMETER
- INPUT IMPEDANCE: 50 kΩ/V DC OR BETTER

(4) FREQUENCY COUNTER
- FREQUENCY MINIMUM: AT LEAST 136MHz
- ACCURACY: BETTER THAN ± 1PPM
- SENSITIVITY: 100 mV OR BETTER

CONNECTIONS



ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
LOCK VOLTAGE	1	• Display frequency: 136.00MHz • Receive mode	MAIN	Connect a voltmeter between R144 and GROUND.	3.6V	MAIN	L104
	2	• RF POWER SWITCH: LOW • Transmit mode			2 ~ 3V		Verify
REFERENCE FREQUENCY	1	• Display frequency: 108.00MHz • Receive mode	RF	Connect a frequency counter to cathode of D215.	118.700MHz	MAIN	C157
	2	• Display frequency: 136.00MHz			146.700MHz ± 100Hz		Verify



L104 Lock Voltage Adj.

R144 Lock Voltage Check Point

C157 Refference frequency adj.

D215 Frequency Check Point

7 - 4 TRANSMITTER ADJUSTMENT

INSTRUMENTS REQUIRED

(1) VOLTAGE REGULATED POWER SUPPLY
- OUTPUT VOLTAGE: DC 13.8V
- CURRENT CAPACITY: 2A

(2) RF POWER METER (TERMINATED TYPE)
- MEASURING PANGE: 0 ~ 5W
- FREQUENCY MINIMUM: AT LEAST 136MHz
- IMPEDANCE: 50 Ω
- SWR: LESS THAN 1:1.2

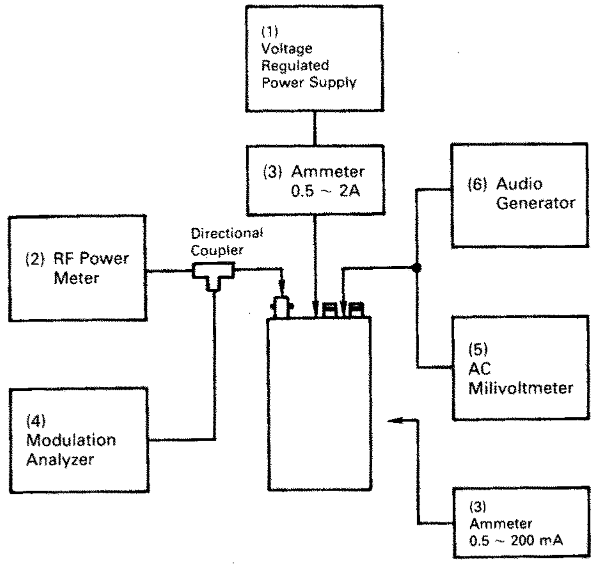
(3) AMMETER
- MEASURING RANGE: 0 ~ 200mA and 0.5 ~ 2A

(4) MODULATION ANALYZER
- FREQUENCY MINIMUM: AT LEAST 136MHz
- MEASURING RANGE: 0 ~ 100%

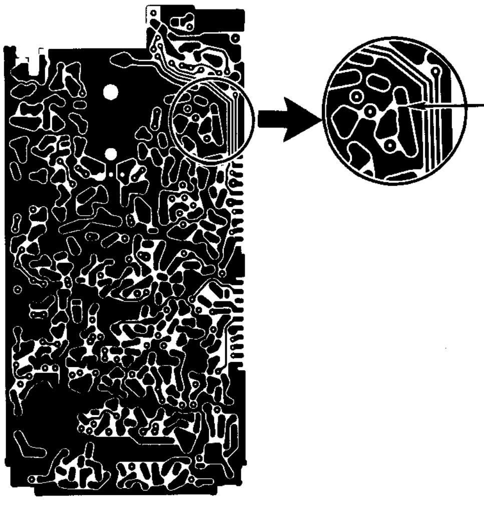
(5) AC MILIVOLTMETER
- MEASURING RANGE: 0 ~ 200mV

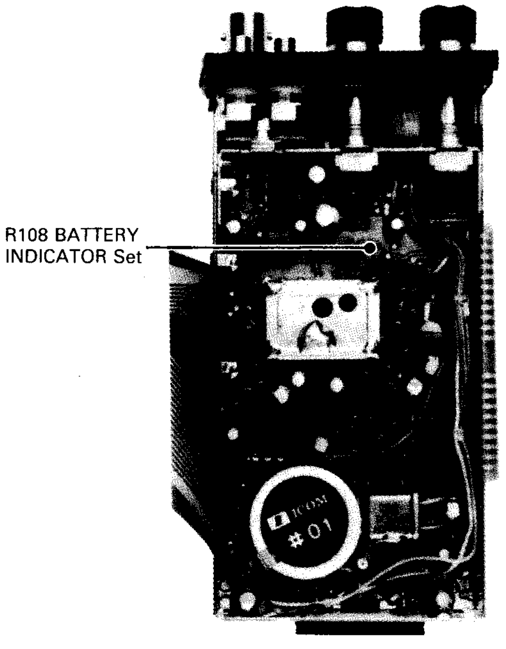
(6) AUDIO GENERATOR
- OUTPUT FREQUENCY: 200 ~ 3000Hz
- OUTPUT LEVEL: 0 ~ 200mV
- DISTORTION: LESS THAN 0.1%

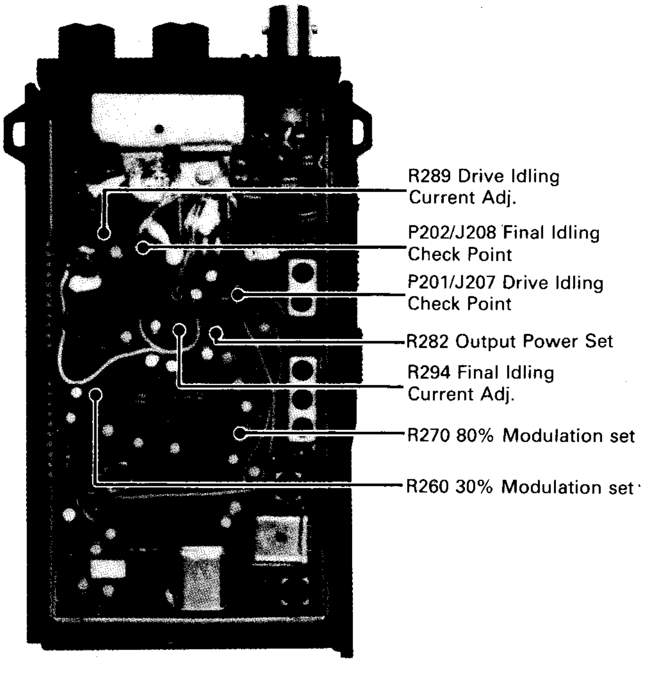
CONNECTIONS



ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
IDLING CURRENT ⓐ DRIVE TRANSISTOR ⓑ FINAL TRANSISTOR	1	• Unsolder land between collector of Q212 and C315. (See the diagram at right) • Unplug P201 and P202. • Transmit mode	RF	Connect an ammeter to J207 (⊕ lead should be connected to L216 side.)	50mA	RF	R289
	2		RF	Connect an ammeter to J208 (⊕ lead should be connected to L220 side.)	100mA	RF	R294
	NOTE: After adjustments of STEPS 1 and 2, turn POWER SWITCH OFF. Plug P201 and P202 into J207 and J208, respectively resolder land between Q212 and C315.						
OUTPUT CARRIER POWER	1	• Display frequency: 127.0125MHz • RF POWER SWITCH: HIGH • Transmit mode	Top panel	Connect a power meter to the ANTENNA CONNECTOR. Connect an ammeter between the power supply and the transceiver in series.	1.45W (less than 0.95A)	RF	R282
VERIFY OUTPUT POWER AT THE BAND EDGES	1	• Display frequency: 118.0125MHz and 135.9875MHz • RF POWER SWITCH: HIGH • Transmit mode			1.25 ~ 1.6W (less than 0.95A)		Verify
		• RF POWER SWITCH: LOW			0.3 ~ 0.6W (less than 0.65A)		Verify
BATTERRY INDICATOR	1	• Transmit mode		Turn R108 C.C.W. to maximum position.		MAIN	R108
MODULATION	1	• Display frequency: 127.0125MHz • Apply AF signal 1 kHz/150mV to the MIC CONNECTOR. • RF POWER SWITCH: HIGH • Transmit mode	Top panel	Connect a modulation analyzer to the ANTENNA CONNECTOR through the attenuator.	80% (output power: approx. 4.8W PEP)	RF	R270
		• Apply AF signal 1 kHz/15mV (20dB down) to the MIC CONNECTOR.			30% (output power: approx. 1.6W PEP)	RF	R260


Unsoldering point for
idling current check


R108 BATTERY
INDICATOR Set


R289 Drive Idling
Current Adj.
P202/J208 Final Idling
Check Point
P201/J207 Drive Idling
Check Point
R282 Output Power Set
R294 Final Idling
Current Adj.
R270 80% Modulation set
R260 30% Modulation set

7 - 5 RECEIVER ADJUSTMENT

INSTRUMENTS REQUIRED

(1) VOLTAGE REGULATED POWER SUPPLY
- OUTPUT VOLTAGE: DC 13.8V
- CURRENT CAPACITY: 2A

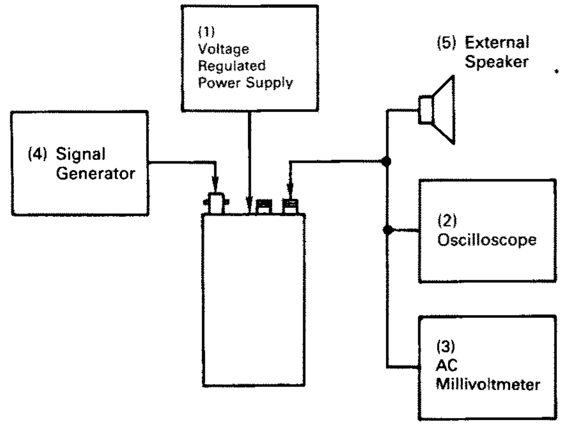
(2) OSCILLOSCOPE
- FREQUENCY RANGE: DC ~ 20MHz
- MEASURING RANGE: 0.01 ~ 10V

(3) AC MILLIVOLTMETER
- MEASURING RANGE: 10mV ~ 10V

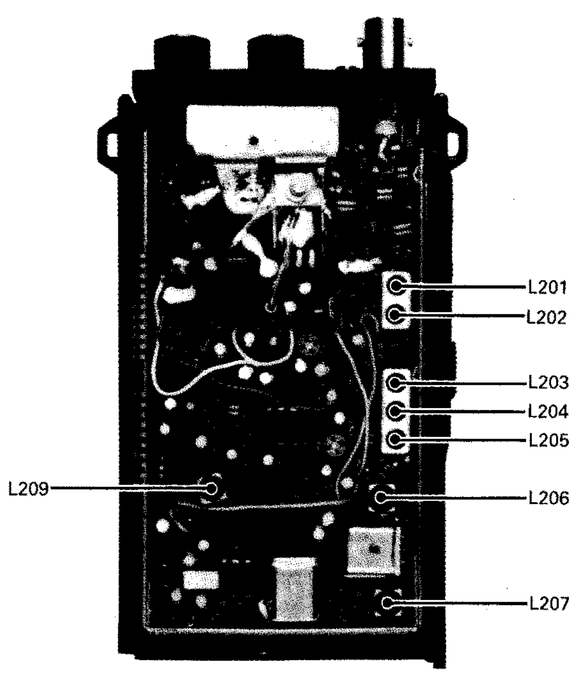
(4) SIGNAL GENERATOR
- FREQUENCY RANGE: 100 ~ 150MHz
- OUTPUT LEVEL: 0.1 µV ~ 32mV (−127dBm ~ −17dBm)

(5) EXTERNAL SPEAKER
- IMPEDANCE: 8 Ω

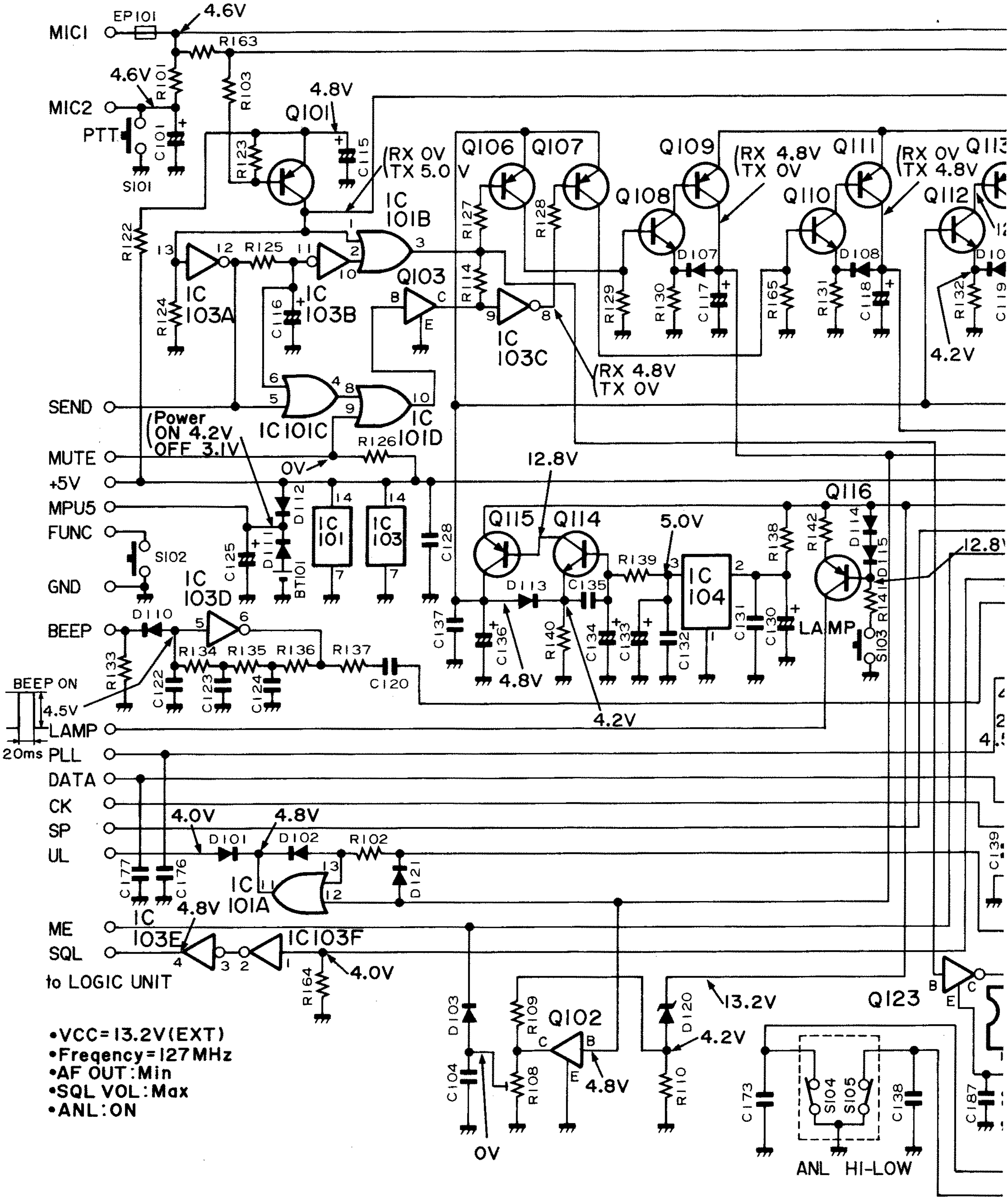
CONNECTIONS



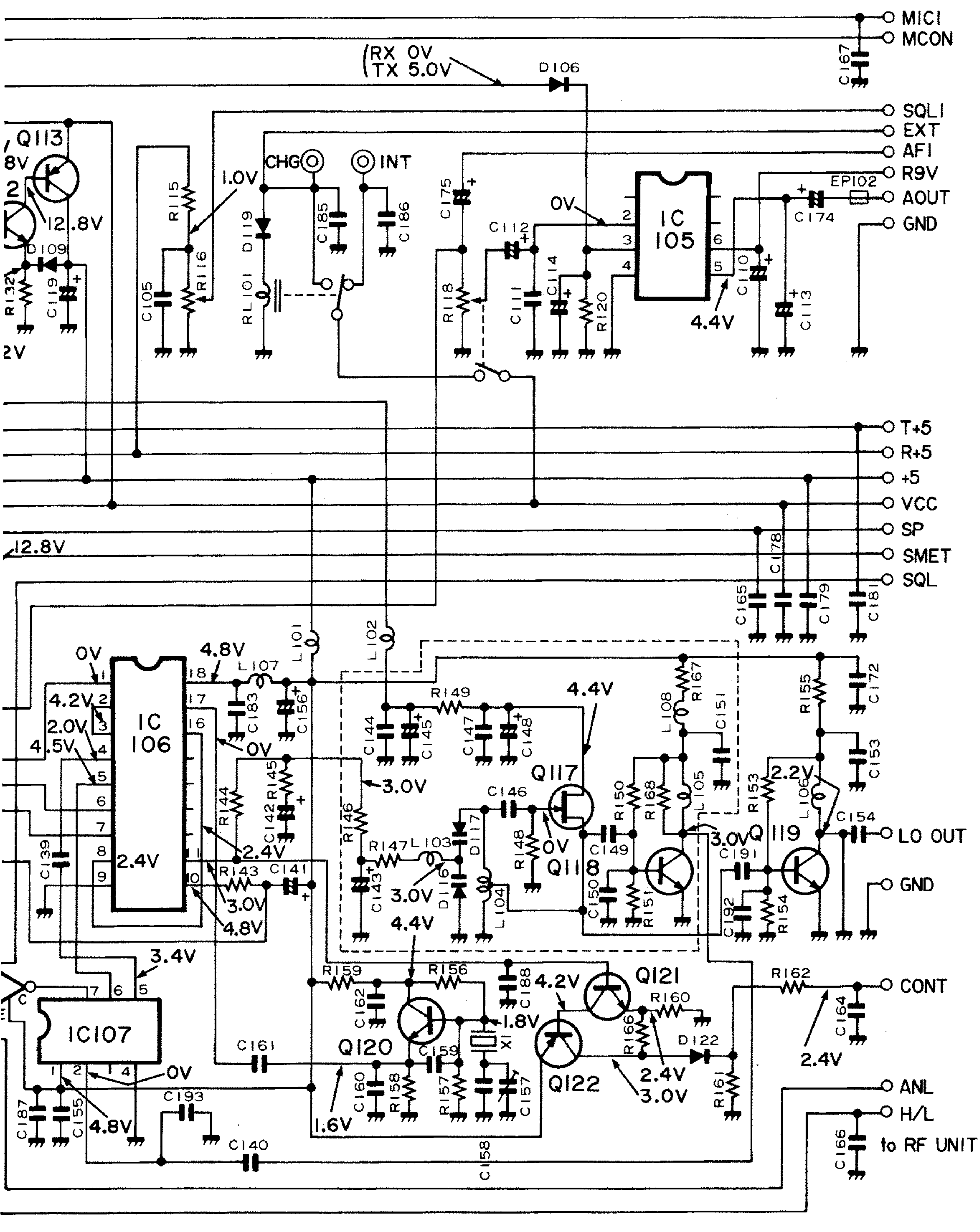
ADJUSTMENT		ADJUSTMENT CONDITIONS	MEASUREMENT		VALUE	ADJUSTMENT POINT	
			UNIT	LOCATION		UNIT	ADJUST
SENSITIVITY	1	• Display frequency: 127.00MHz • ANL SWITCH: OFF • SQUELCH: Open • Apply RF signal to ANTENNA CONNECTOR. Level: 2.0 µV (−101dBm) Mod.: 1 kHz/30%	Top panel	Connect an AC millivoltmeter to the EXTERNAL SPEAKER JACK with an 8 Ω load.	Maximum AF output level	RF	L201 L204 L205 L202 L203
IF FILTER MATCHING	1	• Apply RF signal to ANTENNA CONNECTOR. Level: 2.0 µV (−101dBm) Mod.: 1 kHz/30%	Top panel	Connect an AC millivoltmeter to the EXTERNAL SPEAKER JACK with an 8 Ω load.	Maximum AF output level	RF	L206 L207 L209
	NOTE: Adjust coils as above 2 or 3 times. SENSITIVITY (6 dB S+N/N ratio): 108.000 ~ 118.100 MHz less than 2.0 µV 118.100 ~ 135.900 MHz less than 1.0 µV						
AF OUTPUT	1	• Apply RF signal to the ANTENNA CONNECTOR. Level: 32 µV (−77dBm) Mod.: 1 kHz/30%	Top pannel	Connect an AC millivoltmeter to the EXTERNAL SPEAKER JACK with an 8 Ω load.	More than 2V at 10% distortion		Verify
TIGHT SQUELCH SENSITIVITY	1	• SQUELCH CONTROL: MAX. C.W. • Apply RF signal to ANTENNA CONNECTOR. Level: 32 µV (−77dBm) Mod.: 1 kHz/30%	Top panel	Connect a speaker to the EXTERNAL SPEAKER JACK.	Squelch opens		Verify



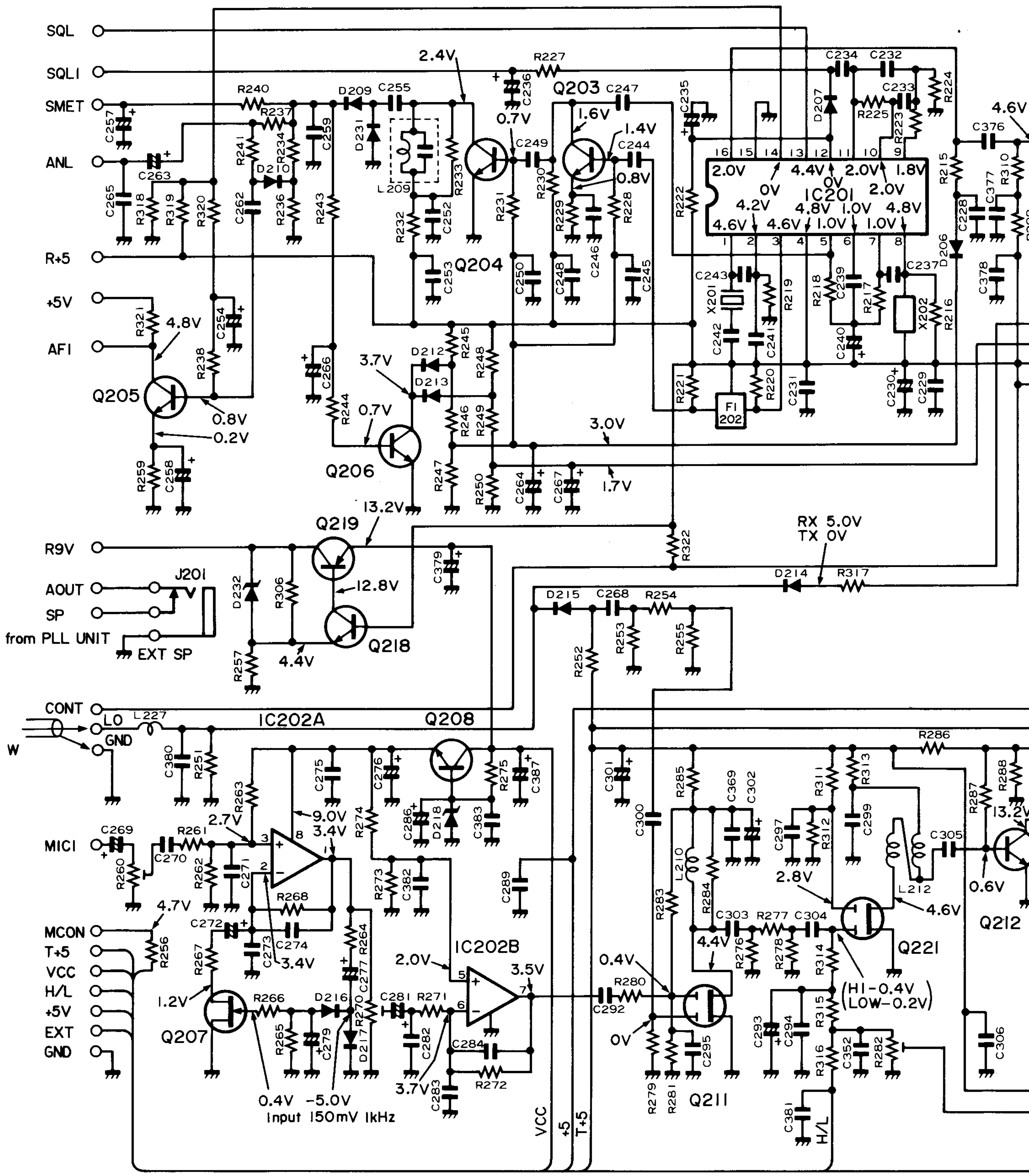
8 - 1 MAIN UNIT

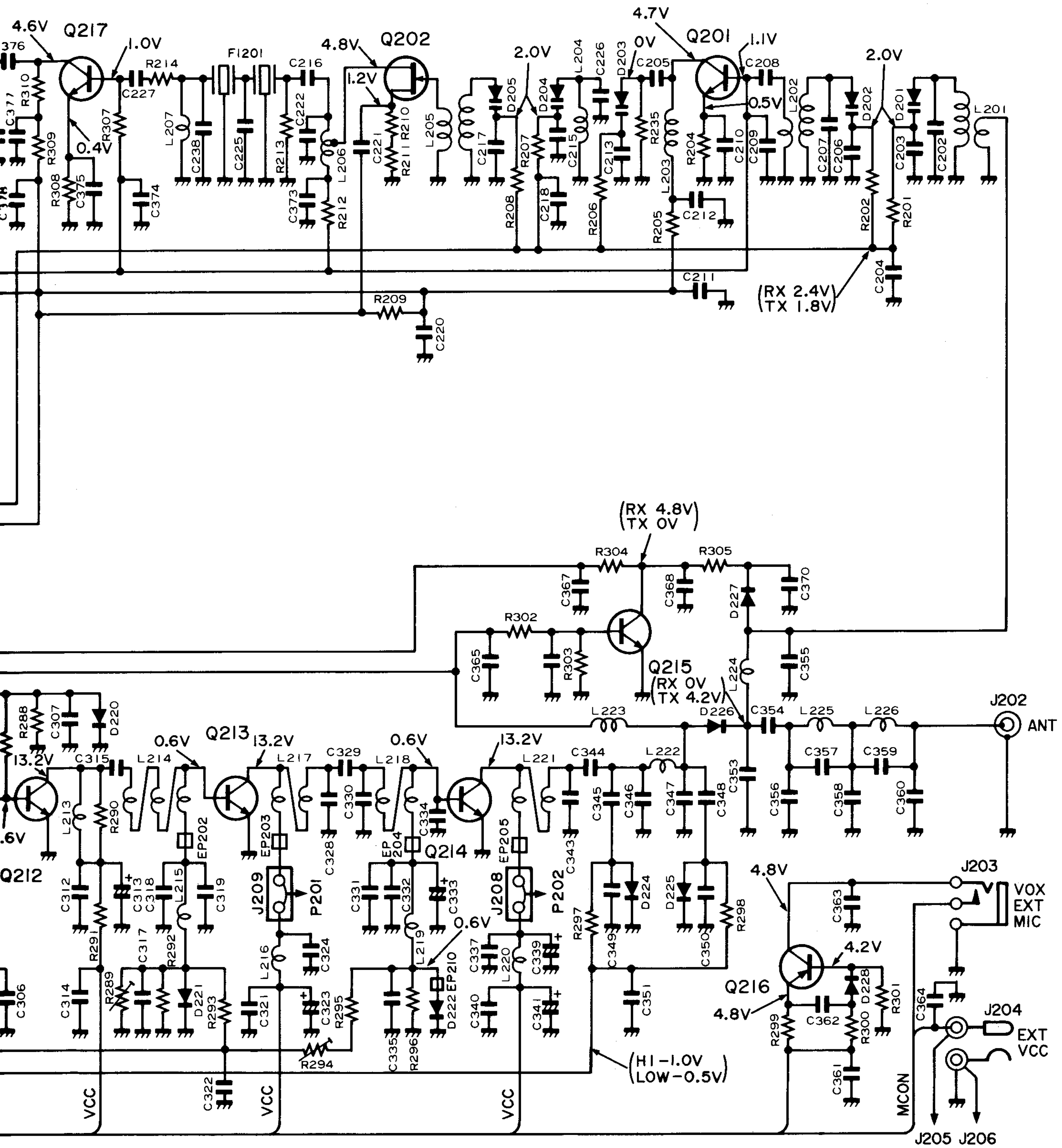


- VCC=13.2V(EXT)
- Freqency=127MHz
- AF OUT:Min
- SQL VOL:Max
- ANL:ON

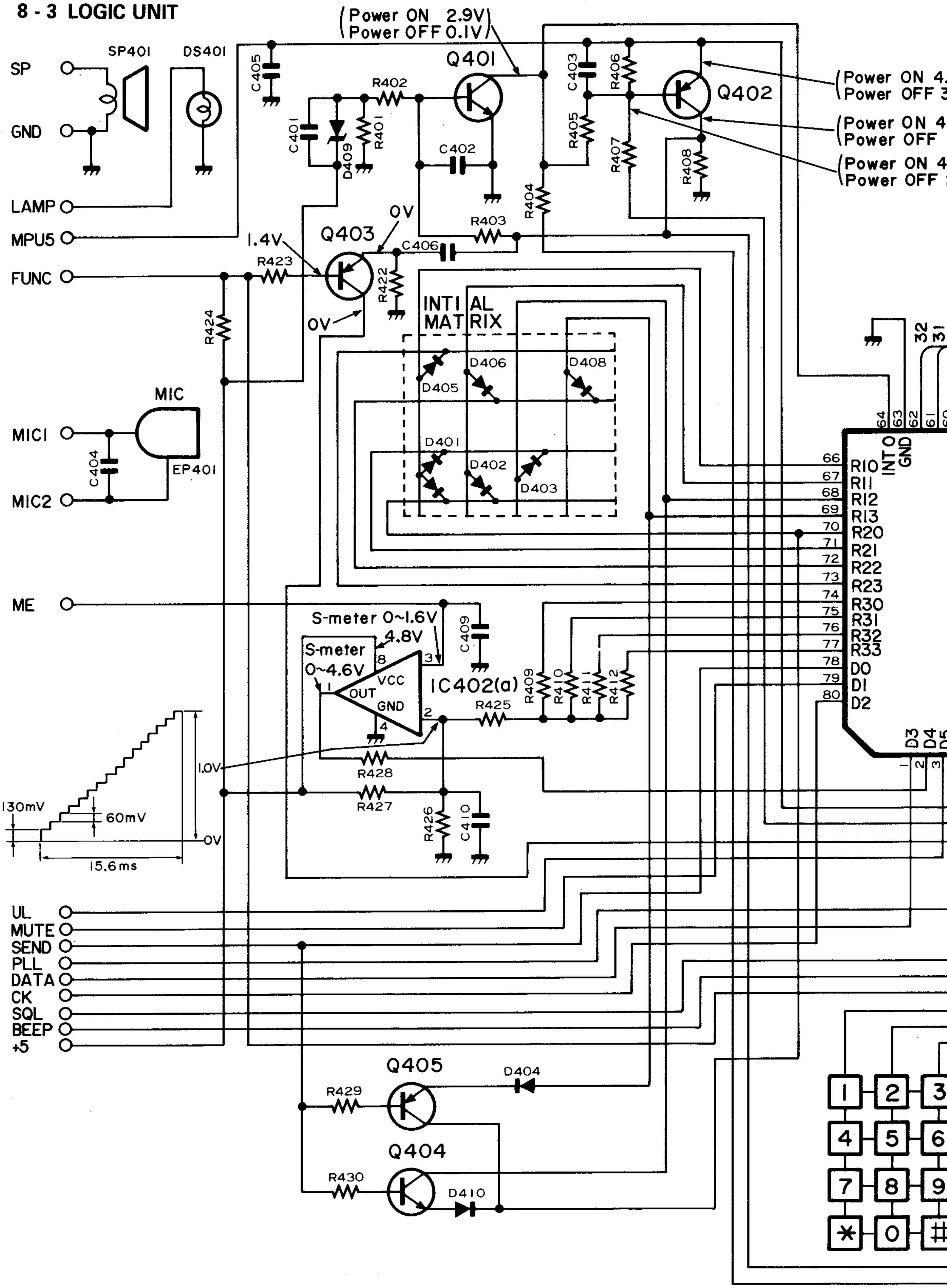

MICI
MCON
RX 0V
TX 5.0V
D106
C167
SQLI
EXT
AFI
R9V
AOUT
GND
EP102
C174
Q113
12.8V
D109
R132
C119
R115
R116
C105
1.0V
CHG
INT
D119
C185
C186
RL101
C175
C112
C111
C114
R118
R120
0V
IC 105
4.4V
C110
C113
T+5
R+5
+5
VCC
SP
SMET
SQL
12.8V
C178
C165
C179
C181
L101
L102
IC 106
0V
4.2V
2.0V
4.5V
4.8V
L107
C183
C156
2.4V
R144
R145
C142
C139
R143
C141
3.0V
R149
C144
C145
C147
C148
R146
R147
L103
D117
D116
C143
L104
Q117
C146
R148
Q118
C149
C150
R150
R168
R151
R167
L108
C151
L105
R155
C172
C153
R153
2.2V
L106
C154
Q119
LO OUT
C191
C192
R154
GND
3.4V
IC107
C187
C155
C193
C140
C161
R159
C162
R156
C188
Q120
C159
1.8V
X1
C160
R158
R157
C157
1.6V
C158
Q121
R160
Q122
R166
D122
R161
R162
C164
CONT
ANL
H/L
C166
to RF UNIT

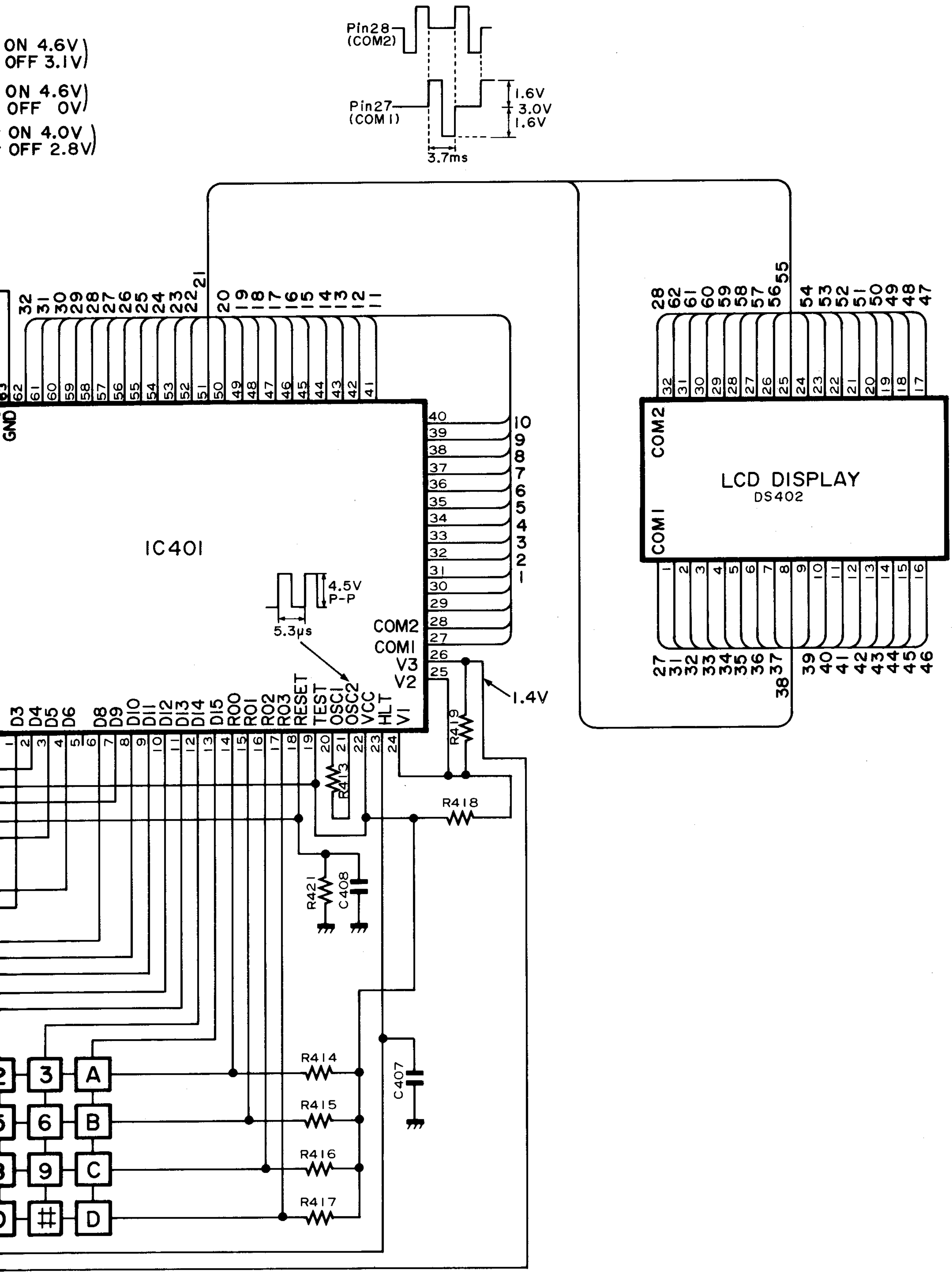
8 - 2 RF UNIT




Q217
Q202
Q201
Q215
Q212
Q213
Q214
Q216
4.6V
1.0V
4.8V
1.2V
4.7V
1.1V
0.5V
0V
2.0V
0.4V
(RX 2.4V TX 1.8V)
(RX 4.8V TX 0V)
(RX 0V TX 4.2V)
13.2V
0.6V
4.2V
(HI -1.0V LOW -0.5V)
J202
ANT
J203
VOX EXT MIC
J204
EXT VCC
J205 J206
J208
J209
P201
P202
MCON
VCC

8 - 3 LOGIC UNIT

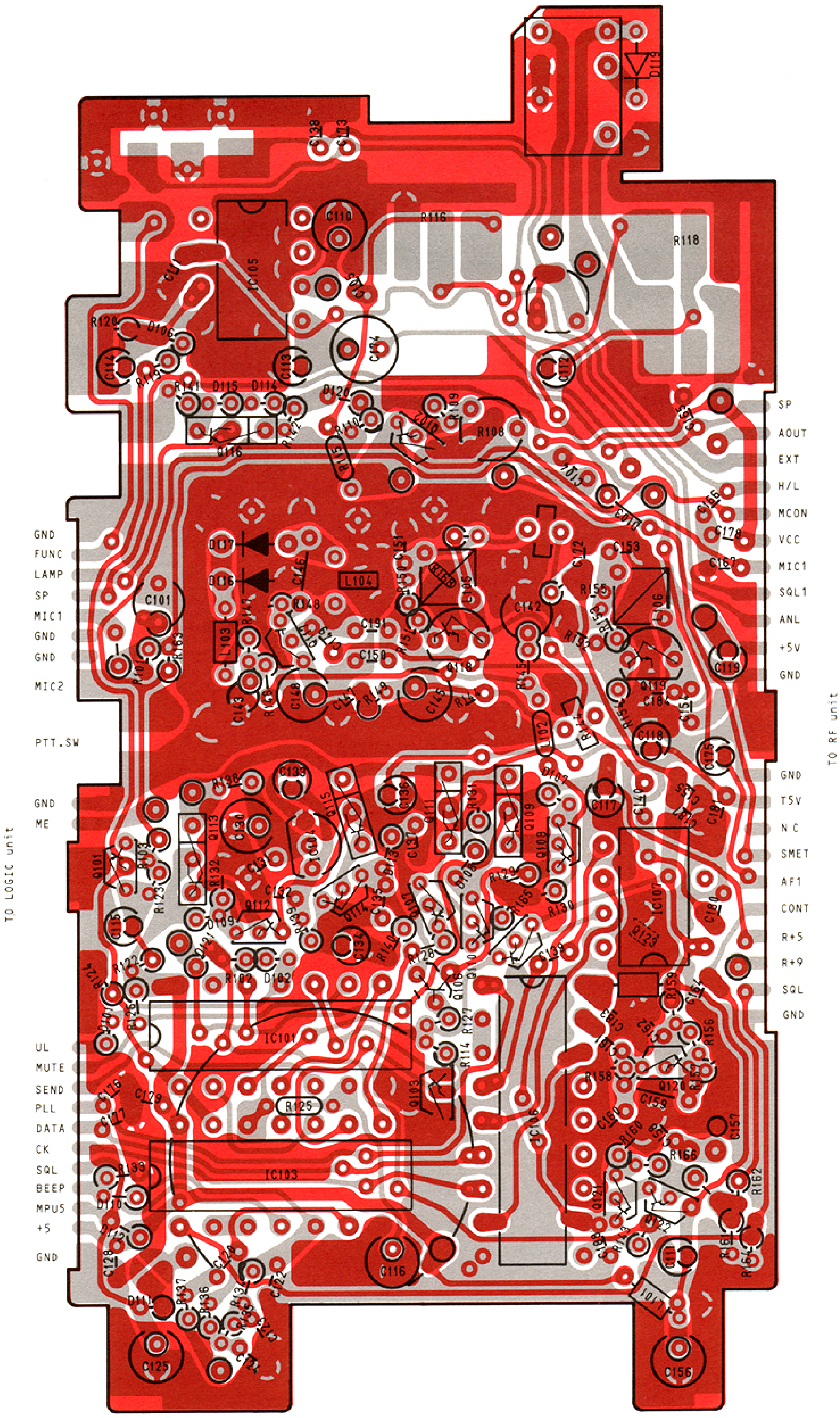




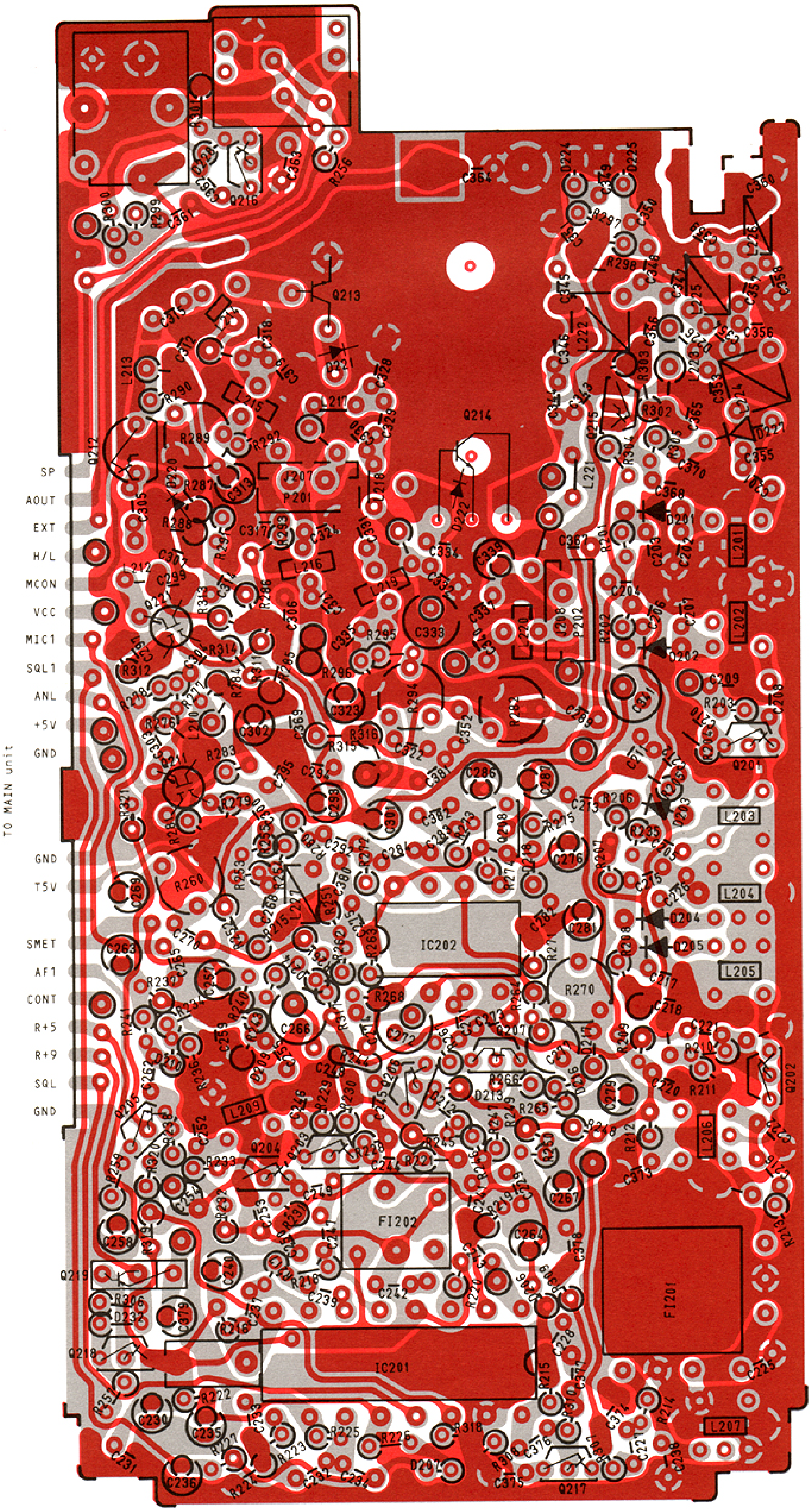
ON 4.6V
OFF 3.1V
ON 4.6V
OFF 0V
ON 4.0V
OFF 2.8V
Pin28
(COM2)
Pin27
(COM1)
1.6V
3.0V
1.6V
3.7ms
IC401
4.5V
P-P
5.3μs
COM2
COM1
V3
V2
GND
D3
D4
D5
D6
D8
D9
D10
D11
D12
D13
D14
D15
RO0
RO1
RO2
RO3
RESET
TEST
OSC1
OSC2
VCC
HLT
V1
1.4V
R419
R413
R418
R421
C408
R414
R415
R416
R417
C407
3
A
6
B
9
C
#
D
LCD DISPLAY
DS402
COM2
COM1

SECTION 9 BOARD LAYOUTS

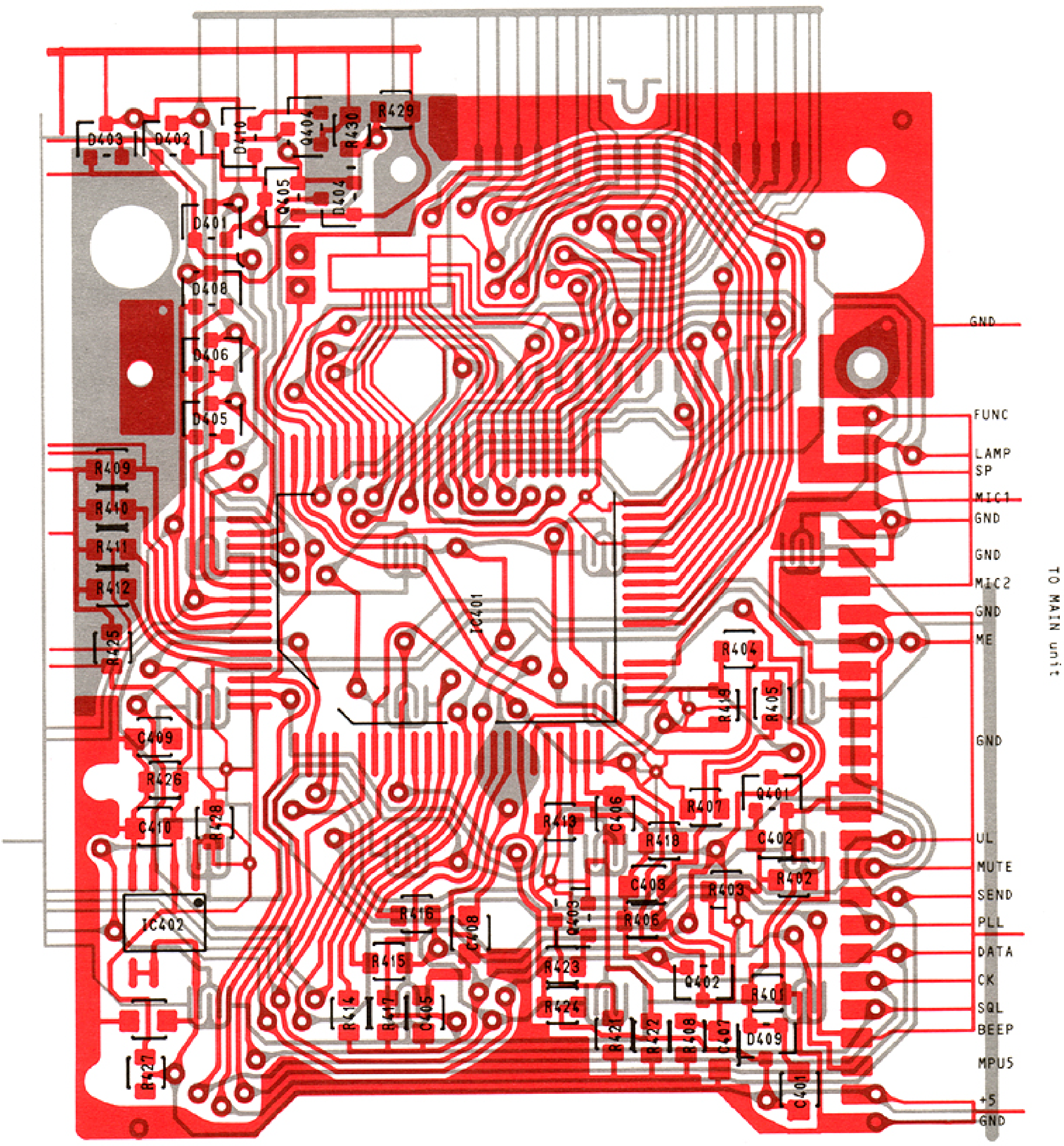
9 - 1 MAIN UNIT



9 - 2 RF UNIT


SP
AOUT
EXT
H/L
MCON
VCC
MIC1
SQL1
ANL
+5V
GND
TO MAIN unit
GND
T5V
SMET
AF1
CONT
R+5
R+9
SQL
GND

9 - 3 LOGIC UNIT



SECTION 10 PARTS LIST

MAIN UNIT

REF. NO.	DESCRIPTION	PART NO.	
IC101	IC	TC4071	BP
IC103	IC	TC4069	UBP
IC104	IC	S81250HG	
IC105	IC	LM386N-3	
IC106	IC	μPD2834C	
IC107	IC	μPB571C	
Q101	TRANSISTOR	2SA1048	GR
Q102	TRANSISTOR	2SC3399	
Q103	TRANSISTOR	2SC3399	
Q106	TRANSISTOR	2SA1048	GR
Q107	TRANSISTOR	2SA1048	GR
Q108	TRANSISTOR	2SC2458	GR
Q109	TRANSISTOR	2SB909M	R
Q110	TRANSISTOR	2SC2458	GR
Q111	TRANSISTOR	2SB909M	R
Q112	TRANSISTOR	2SC2458	GR
Q113	TRANSISTOR	2SB909M	R
Q114	TRANSISTOR	2SC2458	GR
Q115	TRANSISTOR	2SB909M	R
Q116	TRANSISTOR	2SB909M	R
Q117	FET	2SK192A	GR
Q118	TRANSISTOR	2SC2026	
Q119	TRANSISTOR	2SC2026	
Q120	TRANSISTOR	2SC2458	GR
Q121	TRANSISTOR	2SC2458	GR
Q122	TRANSISTOR	2SA1048	GR
Q123	TRANSISTOR	2SA1345	
D101	DIODE	1SS211	
D102	DIODE	1SS211	
D103	DIODE	1SS211	
D106	DIODE	1SS211	
D107	DIODE	1SS211	
D108	DIODE	1SS211	
D109	DIODE	1SS211	
D110	DIODE	1SS211	
D111	DIODE	1SS211	
D112	DIODE	1SS211	
D113	DIODE	1SS211	
D114	DIODE	1SS211	
D115	DIODE	1SS211	
D116	VARICAP	1SV50E (1)	
D117	VARICAP	1SV50E (1)	
D119	DIODE	1SS211	
D120	ZENER	RD9.1E	B1
D121	DIODE	1SS211	
D122	DIODE	1SS211	
X101	CRISTAL	CR9	
L101	COIL	LAL02KR	100K
L103	COIL	LAL02KR	4R7M
L104	COIL	LB-167	
L105	COIL	LA-237	
L106	COIL	LA-237	
L107	COIL	LAL02KR	100K
L108	COIL	LR125	

MAIN UNIT

REF. NO.	DESCRIPTION	PART NO.		
R101	RESISTOR	33K	ELR10	
R102	RESISTOR	100K	ELR10	
R103	RESISTOR	1.2K	ELR10	
R108	TRIMMER	RHM0AJ506A		220K
R109	RESISTOR	100K	ELR10	
R110	RESISTOR	2.2K	ELR10	
R114	RESISTOR	10K	ELR10	
R115	RESISTOR	33K	R10	
R116	VARIABLE	RK9A1000NA		10KB
R118	VARIABLE	RK9A11003A		10KA
R119	RESISTOR	150K	ELR10	
R120	RESISTOR	47K	ELR10	
R122	RESISTOR	470	ELR10	
R123	RESISTOR	10K	ELR10	
R124	RESISTOR	100K	ELR10	
R125	RESISTOR	180K	R10	
R126	RESISTOR	470K	ELR10	
R127	RESISTOR	33K	ELR10	
R128	RESISTOR	33K	ELR10	
R129	RESISTOR	220K	ELR10	
R130	RESISTOR	10K	ELR10	
R131	RESISTOR	10K	ELR10	
R132	RESISTOR	10K	ELR10	
R133	RESISTOR	470K	ELR10	
R134	RESISTOR	1M	ELR10	
R135	RESISTOR	220K	ELR10	
R136	RESISTOR	39K	ELR10	
R137	RESISTOR	2.2M	ELR20	
R138	RESISTOR	470	ELR10	
R139	RESISTOR	10K	ELR10	
R140	RESISTOR	33K	ELR10	
R141	RESISTOR	5.6K	ELR10	
R142	RESISTOR	12	ELR10	
R143	RESISTOR	470K	ELR10	
R144	RESISTOR	15K	R10	
R145	RESISTOR	680	ELR10	
R146	RESISTOR	470	ELR10	
R147	RESISTOR	220	ELR10	
R148	RESISTOR	100K	ELR10	
R149	RESISTOR	100	ELR10	
R150	RESISTOR	5.6K	ELR10	
R151	RESISTOR	3.3K	ELR10	
R153	RESISTOR	5.6K	ELR10	
R154	RESISTOR	4.7K	ELR10	
R155	RESISTOR	330	ELR10	
R156	RESISTOR	220K	ELR10	
R157	RESISTOR	220K	ELR10	
R158	RESISTOR	5.6K	ELR10	
R159	RESISTOR	1.5K	ELR10	
R160	RESISTOR	10K	ELR10	
R161	RESISTOR	10K	ELR10	
R162	RESISTOR	1K	ELR10	
R163	RESISTOR	1.2K	ELR10	
R164	RESISTOR	47K	ELR10	
R165	RESISTOR	220K	ELR10	
R166	RESISTOR	2.2K	ELR10	
R167	RESISTOR	470	ELR10	
R168	RESISTOR	470	ELR10	

MAIN UNIT

REF. NO.	DESCRIPTION	PART NO.		
C101	TANTALUM	0.1	35V	
C104	BARRIER LAY	0.01	25V	
C105	CERAMIC	0.001	50V	
C110	ELECTROLYTIC	33	10V	MS5
C111	BARRIER LAY	0.0047	25V	
C112	ELECTROLYTIC	0.47	50V	MS5
C113	ELECTROLYTIC	1	50V	MS5
C114	ELECTROLYTIC	2.2	50V	MS5
C115	ELECTROLYTIC	10	16V	MS5
C116	ELECTROLYTIC	0.22	50V	MS5
C117	ELECTROLYTIC	22	6.3V	MS5
C118	ELECTROLYTIC	47	6.3V	MS5
C119	ELECTROLYTIC	22	6.3V	MS5
C120	CERAMIC	100P	50V	
C122	CERAMIC	100P	50V	
C123	CERAMIC	470P	50V	
C124	BARRIER LAY	0.0027	25V	
C125	ELECTROLYTIC	47	6.3V	MS5
C128	CERAMIC	0.001	50V	
C130	ELECTROLYTIC	22	16V	MS5
C131	CERAMIC	0.001	50V	
C132	CERAMIC	0.001	50V	
C133	ELECTROLYTIC	22	6.3V	MS5
C134	ELECTROLYTIC	22	6.3V	MS5
C135	CERAMIC	470P	50V	
C136	ELECTROLYTIC	22	6.3V	MS5
C137	CERAMIC	0.001	50V	
C138	CERAMIC	0.001	50V	
C139	BARRIER LAY	0.01	25V	
C140	CERAMIC	22P	50V	
C141	ELECTROLYTIC	1	50V	MS5
C142	TANTALUM	1	35V	
C143	TANTALUM	0.1	35V	
C144	CERAMIC	0.001	50V	
C145	ELECTROLYTIC	10	16V	MS5
C146	CERAMIC	100P	50V	SH
C147	CERAMIC	0.001	50V	
C148	ELECTROLYTIC	10	16V	MS5
C149	CERAMIC	2P	50V	
C150	CERAMIC	47P	50V	
C151	CERAMIC	3P	50V	
C153	CERAMIC	0.001	50V	
C154	CERAMIC	100P	50V	
C155	MONOLITHIC	D33Y5V1E	104Z21	0.1
C156	ELECTROLYTIC	47	6.3V	MS5
C157	TRIMMER	ECR-GA010D30		10P
C158	CERAMIC	20P	50V	
C159	CERAMIC	220P	50V	
C160	CERAMIC	100P	50V	
C161	CERAMIC	0.001	50V	
C162	BARRIER LAY	0.01	25V	
C164	CERAMIC	470P	50V	
C165	CERAMIC	470P	50V	
C166	CERAMIC	470P	50V	
C167	CERAMIC	470P	50V	
C172	CERAMIC	0.001	50V	
C173	CERAMIC	0.001	50V	
C174	ELECTROLYTIC	47	10V	MS5
C175	ELECTROLYTIC	1	50V	MS5
C176	CERAMIC	0.001	50V	
C177	CERAMIC	0.001	50V	
C178	CERAMIC	0.001	50V	
C179	CERAMIC	0.001	50V	
C181	CERAMIC	0.001	50V	

MAIN UNIT

REF. NO.	DESCRIPTION	PART NO.	
C183	BARRIER LAY	0.01	25V
C184	CERAMIC	33P	50V
C185	CERAMIC	0.001	50V
C186	CERAMIC	0.001	50V
C187	BARRIER LAY	0.01	25V
C188	CERAMIC	0.001	50V
C191	CERAMIC	3P	50V
C192	CERAMIC	20P	50V
C193	CERAMIC	22P	50V
RL101	RELAY	OUC-SS-114D	
S101	SWITCH	SKHHAB062A	
S102	SWITCH	SKHHAB062A	
S103	SWITCH	SKHHAB062A	
S104	SWITCH	SPPH22014A	
S105	SWITCH	SPPH22014A	
BT101	LITHIUM BATTERY	BR2325-1HC	
EP101	FERRITE BEADS	DL2-OP2.6-3-1.2H	
EP102	FERRITE BEADS	DL2-OP2.6-3-1.2H	
B101	P.C.B.	B-976B (MAIN)	
B102	P.C.B.	B-824A (SW. UNIT)	
B103	F.P.C.	B-812 (MAIN-RF)	
B104	F.P.C.	B-1077 (REAR SIDE)	
B105	F.P.C.	B-1078 (REAR SIDE)	
B106	F.P.C.	B-1079 (REAR SIDE)	

RF UNIT

REF. NO.	DESCRIPTION	PART NO.	
IC201	IC	MC3357P	
IC202	IC	μPC358C	
Q201	TRANSISTOR	2SC2668	O
Q202	FET	2SK241	Y
Q203	TRANSISTOR	2SC2668	O
Q204	TRANSISTOR	2SC2668	O
Q205	TRANSISTOR	2SC2458	GR
Q206	TRANSISTOR	2SC2458	GR
Q207	FET	2SK184	Y
Q208	TRANSISTOR	2SC2458	GR
Q211	FET	3SK74	M
Q212	TRANSISTOR	2SC2407A	
Q213	TRANSISTOR	2SC1947	
Q214	TRANSISTOR	2SC1972	
Q215	TRANSISTOR	2SC2458	GR
Q216	TRANSISTOR	2SA1048	GR
Q217	TRANSISTOR	2SC2668	O
Q218	TRANSISTOR	2SC2458	GR
Q219	TRANSISTOR	2SB909M	R
Q221	FET	3SK74	M
D201	VARICAP	1SV153	
D202	VARICAP	1SV153	
D203	VARICAP	1SV153	
D204	VARICAP	1SV153	
D205	VARICAP	1SV153	
D206	DIODE	1SS211	
D207	DIODE	1SS211	

RF UNIT

REF. NO.	DESCRIPTION	PART NO.	
D209	DIODE	1SS97	
D210	DIODE	1SS211	
D212	DIODE	1SS211	
D213	DIODE	1SS211	
D214	DIODE	1SS216	
D215	DIODE	1SS216	
D216	DIODE	1SS211	
D217	DIODE	1SS211	
D218	ZENER	RD10E	B2
D220	DIODE	1S953	
D221	DIODE	1S953	
D222	DIODE	1S953	
D224	DIODE	1SS97	
D225	DIODE	1SS97	
D226	DIODE	1SS216	
D227	DIODE	1SS216	
D228	DIODE	1SS211	
D231	DIODE	1SS97	
D232	ZENER	RD5.6E	B3
FI201	CRYSTAL	FL-75	10M15BA
FI202	CERAMIC	CFU455HT	
X201	CRYSTAL	CR114	
X202	DISCRIMINATOR	CDB455C7A	
L201	COIL	LB-170	
L202	COIL	LB-170	
L203	COIL	LB-172	
L204	COIL	LB-172	
L205	COIL	LB-178	
L206	COIL	LS-272	
L207	COIL	LS-283	
L209	COIL	LS-158	
L210	COIL	LAL03NA	2R2M
L212	COIL	LR-161	
L213	COIL	LAL03NA	2R2M
L214	COIL	LR-160	
L215	COIL	LR-125	
L216	COIL	LR-125	
L217	COIL	LR-161	
L218	COIL	LR-161	
L219	COIL	LR-125	
L220	COIL	LR-125	
L221	COIL	LR-162	
L222	COIL	LA-237	
L223	COIL	LAL03NA	4R7K
L224	COIL	LA-237	
L225	COIL	LA-236	
L226	COIL	LA-234	
L227	COIL	LA-234	
R201	RESISTOR	220K	ELR10
R202	RESISTOR	220K	ELR10
R203	RESISTOR	47K	ELR10
R204	RESISTOR	470	ELR10
R205	RESISTOR	100	ELR10
R206	RESISTOR	220K	ELR10
R207	RESISTOR	220K	ELR10
R208	RESISTOR	220K	ELR10
R209	RESISTOR	10K	ELR10
R210	RESISTOR	47	ELR10
R211	RESISTOR	2.2K	ELR10
R212	RESISTOR	100	ELR10

RF UNIT

REF. NO.	DESCRIPTION	PART NO.		
R213	RESISTOR	10K	ELR10	
R214	RESISTOR	470	ELR10	
R215	RESISTOR	33K	ELR10	
R216	RESISTOR	4.7K	ELR10	
R217	RESISTOR	47K	ELR10	
R218	RESISTOR	1K	ELR10	
R219	RESISTOR	47K	ELR10	
R220	RESISTOR	2.2K	ELR10	
R221	RESISTOR	2.2K	ELR10	
R222	RESISTOR	150K	ELR10	
R223	RESISTOR	47K	ELR10	
R224	RESISTOR	5.6K	ELR10	
R225	RESISTOR	330K	ELR10	
R227	RESISTOR	12K	ELR10	
R228	RESISTOR	100K	ELR10	
R229	RESISTOR	3.3K	ELR10	
R230	RESISTOR	2.2K	ELR10	
R231	RESISTOR	150K	ELR10	
R232	RESISTOR	1K	ELR10	
R233	RESISTOR	5.6K	ELR10	
R234	RESISTOR	22K	ELR10	
R235	RESISTOR	1K	ELR10	
R236	RESISTOR	10K	ELR10	
R237	RESISTOR	330K	ELR10	
R238	RESISTOR	100K	ELR10	
R240	RESISTOR	1M	ELR10	
R241	RESISTOR	100K	ELR10	
R243	RESISTOR	100K	ELR10	
R244	RESISTOR	47K	R10	
R245	RESISTOR	4.7K	ELR10	
R246	RESISTOR	3.3K	ELR10	
R247	RESISTOR	22K	ELR10	
R248	RESISTOR	10K	ELR10	
R249	RESISTOR	33K	ELR10	
R250	RESISTOR	33K	ELR10	
R251	RESISTOR	22K	ELR10	
R252	RESISTOR	10K	R10	
R253	RESISTOR	180	ELR10	
R254	RESISTOR	33	ELR10	
R255	RESISTOR	180	ELR10	
R256	RESISTOR	1K	ELR10	
R257	RESISTOR	1.5K	ELR10	
R259	RESISTOR	2.2K	ELR10	
R260	TRIMMER	RHM0AJ305A		2.2K
R261	RESISTOR	1K	ELR10	
R262	RESISTOR	220K	ELR10	
R263	RESISTOR	330K	ELR10	
R264	RESISTOR	22K	ELR10	
R265	RESISTOR	1M	ELR10	
R266	RESISTOR	220K	ELR10	
R267	RESISTOR	5.6K	ELR10	
R268	RESISTOR	470K	ELR10	
R270	TRIMMER	RHM0A1408A		10K
R271	RESISTOR	82K	ELR10	
R272	RESISTOR	150K	ELR10	
R273	RESISTOR	680K	ELR10	
R274	RESISTOR	1M	ELR10	
R275	RESISTOR	10K	ELR10	
R276	RESISTOR	1K	ELR10	
R277	RESISTOR	470	ELR10	
R278	RESISTOR	1K	ELR10	
R279	RESISTOR	100K	ELR10	
R280	RESISTOR	1K	ELR10	
R281	RESISTOR	39K	ELR10	

RF UNIT

REF. NO.	DESCRIPTION	PART NO.		
R282	TRIMMER	RHM0A1408A	10K	
R283	RESISTOR	470K	ELR10	
R284	RESISTOR	470	ELR10	
R285	RESISTOR	47	ELR10	
R286	RESISTOR	180	ELR10	
R287	RESISTOR	180	ELR10	
R288	RESISTOR	1K	ELR10	
R289	TRIMMER	RHM0AN205A	330	
R290	RESISTOR	470	ELR10	
R291	RESISTOR	47	ELR10	
R292	RESISTOR	470	ELR10	
R293	RESISTOR	150	ELR20	
R294	TRIMMER	RHM0AS208A	470	
R295	RESISTOR	150	ELR20	
R296	RESISTOR	330	ELR10	
R297	RESISTOR	4.7K	ELR10	
R298	RESISTOR	4.7K	ELR10	
R299	RESISTOR	27	ELR10	
R300	RESISTOR	5.6K	ELR10	
R301	RESISTOR	47K	ELR10	
R302	RESISTOR	10K	ELR10	
R303	RESISTOR	47K	ELR10	
R304	RESISTOR	1M	ELR10	
R305	RESISTOR	220	ELR10	
R306	RESISTOR	56K	ELR10	
R307	RESISTOR	100K	ELR10	
R308	RESISTOR	1K	ELR10	
R309	RESISTOR	100	ELR10	
R310	RESISTOR	220	ELR10	
R311	RESISTOR	39K	ELR10	
R312	RESISTOR	56K	ELR10	
R313	RESISTOR	47	ELR10	
R314	RESISTOR	22K	ELR10	
R315	RESISTOR	47K	ELR10	
R316	RESISTOR	2.2K	ELR10	
R317	RESISTOR	47	ELR10	
R318	RESISTOR	10K	ELR10	
R319	RESISTOR	22K	ELR10	
R320	RESISTOR	33K	ELR10	
R321	RESISTOR	4.7K	ELR10	
R322	RESISTOR	100K	R10	
C201	CERAMIC	0.001	50V	
C202	CERAMIC	3P	50V	
C203	CERAMIC	0.001	50V	
C204	CERAMIC	0.001	50V	
C205	CERAMIC	0.001	50V	
C206	CERAMIC	0.001	50V	
C207	CERAMIC	4P	50V	
C208	CERAMIC	100P	50V	
C209	CERAMIC	0.001	50V	
C210	CERAMIC	0.001	50V	
C211	CERAMIC	0.001	50V	
C212	CERAMIC	0.001	50V	
C213	CERAMIC	0.001	50V	
C215	CERAMIC	0.001	50V	
C216	CERAMIC	0.001	50V	
C217	CERAMIC	0.001	50V	
C218	CERAMIC	0.001	50V	
C220	CERAMIC	0.001	50V	
C221	CERAMIC	47P	50V	
C222	CERAMIC	68P	50V	
C225	CERAMIC	3P	50V	
C226	CERAMIC	4P	50V	

RF UNIT

REF. NO.	DESCRIPTION	PART NO.		
C227	CERAMIC	0.001	50V	
C228	CERAMIC	0.001	50V	
C229	CERAMIC	0.001	50V	
C230	ELECTROLYTIC	10	16V	MS5
C231	BARRIER LAY	0.01	25V	
C232	CERAMIC	33P	50V	
C233	CERAMIC	0.001	50V	
C234	MONOLITHIC	D33Y5V1E	104Z21	0.1
C235	ELECTROLYTIC	4.7	25V	MS5
C236	ELECTROLYTIC	10	16V	MS5
C237	BARRIER LAY	150P	25V	
C238	CERAMIC	27P	50V	
C239	MONOLITHIC	D33Y5V1E	104Z21	0.1
C240	ELECTROLYTIC	0.22	50V	MS5
C241	BARRIER LAY	220P	25V	
C242	CERAMIC	33P	50V	
C243	CERAMIC	82P	50V	
C244	BARRIER LAY	0.01	25V	
C245	CERAMIC	0.001	50V	
C246	BARRIER LAY	0.01	25V	
C247	CERAMIC	100P	50V	
C248	CERAMIC	0.001	50V	
C249	CERAMIC	22P	50V	
C250	CERAMIC	0.001	50V	
C252	BARRIER LAY	0.01	25V	
C253	CERAMIC	0.001	50V	
C254	TANTALUM	1	35V	
C255	CERAMIC	22P	50V	
C257	ELECTROLYTIC	0.1	50V	MS5
C258	ELECTROLYTIC	4.7	25V	MS5
C259	BARRIER LAY	0.0047	25V	
C262	BARRIER LAY	0.0022	25V	
C263	ELECTROLYTIC	0.22	50V	MS5
C264	ELECTROLYTIC	4.7	25V	MS5
C265	CERAMIC	0.001	50V	
C266	ELECTROLYTIC	0.47	50V	MS5
C267	ELECTROLYTIC	4.7	25V	MS5
C268	CERAMIC	22P	50V	
C269	ELECTROLYTIC	0.47	50V	MS5
C270	BARRIER LAY	0.0068	25V	
C271	CERAMIC	470P	50V	
C272	ELECTROLYTIC	0.22	50V	MS5
C273	CERAMIC	0.001	50V	
C274	CERAMIC	47P	50V	
C275	CERAMIC	0.001	50V	
C276	ELECTROLYTIC	10	16V	MS5
C277	ELECTROLYTIC	1	50V	MS5
C279	ELECTROLYTIC	0.1	50V	MS5
C281	ELECTROLYTIC	1	50V	MS5
C282	CERAMIC	470P	50V	
C283	CERAMIC	0.001	50V	
C284	CERAMIC	100P	50V	
C286	ELECTROLYTIC	10	16V	MS5
C287	ELECTROLYTIC	10	16V	MS5
C289	CERAMIC	0.001	50V	
C292	BARRIER LAY	0.01	25V	
C293	ELECTROLYTIC	4.7	25V	MS5
C294	CERAMIC	0.001	50V	
C295	CERAMIC	0.001	50V	
C297	CERAMIC	0.001	50V	
C299	CERAMIC	0.001	50V	
C300	CERAMIC	22P	50V	
C301	ELECTROLYTIC	10	16V	MS5
C302	ELECTROLYTIC	10	16V	MS5

RF UNIT

REF. NO.	DESCRIPTION	PART NO.		
C303	CERAMIC	0.001	50V	
C304	CERAMIC	0.001	50V	
C305	CERAMIC	82P	50V	
C306	CERAMIC	0.001	50V	
C307	CERAMIC	0.001	50V	
C312	BARRIER LAY	0.01	25V	
C313	ELECTROLYTIC	10	16V	MS5
C314	CERAMIC	0.001	50V	
C315	CERAMIC	22P	50V	
C317	CERAMIC	0.001	50V	
C318	CERAMIC	0.001	50V	
C319	BARRIER LAY	0.01	25V	
C321	BARRIER LAY	0.01	25V	
C322	CERAMIC	0.001	50V	
C323	ELECTROLYTIC	10	16V	MS5
C324	CERAMIC	0.001	50V	
C328	CERAMIC	22P	50V	
C329	CERAMIC	0.001	50V	
C330	CERAMIC	10P	50V	
C331	CERAMIC	0.001	50V	
C332	BARRIER LAY	0.01	25V	
C333	ELECTROLYTIC	10	16V	MS5
C334	CERAMIC	100P	50V	
C335	CERAMIC	0.001	50V	
C337	CERAMIC	0.001	50V	
C339	ELECTROLYTIC	10	16V	MS5
C340	BARRIER LAY	0.01	25V	
C341	ELECTROLYTIC	10	16V	MS5
C343	CERAMIC	22P	50V	
C344	CERAMIC	0.001	50V	
C345	CERAMIC	1P	50V	
C346	CERAMIC	22P	50V	
C347	CERAMIC	22P	50V	
C348	CERAMIC	1P	50V	
C349	CERAMIC	5P	50V	
C350	CERAMIC	5P	50V	
C351	CERAMIC	0.001	50V	
C352	CERAMIC	0.001	50V	
C353	CERAMIC	8P	50V	
C354	CERAMIC	0.001	50V	
C355	CERAMIC	8P	50V	
C356	CERAMIC	22P	50V	
C357	CERAMIC	2P	50V	
C358	CERAMIC	33P	50V	
C359	CERAMIC	15P	50V	
C360	CERAMIC	15P	50V	
C361	CERAMIC	0.001	50V	
C362	CERAMIC	0.001	50V	
C363	CERAMIC	0.001	50V	
C364	CERAMIC	0.001	50V	
C365	CERAMIC	0.001	50V	
C366	CERAMIC	0.001	50V	
C367	CERAMIC	0.001	50V	
C368	CERAMIC	0.001	50V	
C369	CERAMIC	0.001	50V	
C370	BARRIER LAY	0.01	25V	
C373	BARRIER LAY	0.0047	25V	
C374	CERAMIC	0.001	50V	
C375	BARRIER LAY	0.0047	25V	
C376	CERAMIC	0.001	50V	
C377	CERAMIC	0.001	50V	
C378	BARRIER LAY	0.0047	25V	
C379	ELECTROLYTIC	10	16V	MS5
C380	CERAMIC	4P	50V	

RF UNIT

REF. NO.	DESCRIPTION	PART NO.	
C381	CERAMIC	470P	50V
C382	CERAMIC	470P	50V
P201	CONNECTOR	IMSA-9201-HT	
P202	CONNECTOR	IMSA-9201-HT	
J201	CONNECTOR	HSJ0836-01-010	
J202	CONNECTOR	BNC-RM-106	
J203	CONNECTOR	HSJ1102-01-040	
J204	CONNECTOR	HEC0747-01-010	
J205	CONNECTOR	171255-1	
J206	CONNECTOR	171255-1	
J207	CONNECTOR	IMSA-9201B-1-02-T	
J208	CONNECTOR	IMSA-9201B-1-02-T	
B201	P.C.B.	B-975E	
EP202	FERRITE BEAD	DL2-OP2.6-3-1.2H	
EP203	FERRITE BEAD	DL2-OP2.6-3-1.2H	
EP204	FERRITE BEAD	DL2-OP2.6-3-1.2H	
EP205	FERRITE BEAD	DL2-OP2.6-3-1.2H	
EP210	FERRITE BEAD	DL2-OP2.6-3-1.2H	

LOGIC UNIT

REF. NO.	DESCRIPTION	PART NO.	
IC401	IC	HD44795A61	
IC402	IC	LA6393M	
Q401	TRANSISTOR	2SC2712	Y
Q402	TRANSISTOR	2SA1162	Y
Q403	TRANSISTOR	2SA1162	Y
Q404	TRANSISTOR	2SC2712	Y
Q405	TRANSISTOR	2SA1162	Y
D401	DIODE	1SS181	
D402	DIODE	1SS190	
D403	DIODE	1SS187	
D404	DIODE	1SS190	
D405	DIODE	1SS187	
D406	DIODE	1SS190	
D408	DIODE	1SS190	
D409	ZENER	RD4.7M	B3
D410	DIODE	1SS196	
R401	RESISTOR	6.8K	MCR10
R402	RESISTOR	15K	MCR10
R403	RESISTOR	1M	MCR10
R404	RESISTOR	15K	MCR10
R405	RESISTOR	100K	MCR10
R406	RESISTOR	100K	MCR10
R407	RESISTOR	100K	MCR10
R408	RESISTOR	15K	MCR10
R409	RESISTOR	270K	MCR10
R410	RESISTOR	120K	MCR10
R411	RESISTOR	68K	MCR10
R412	RESISTOR	33K	MCR10
R413	RESISTOR	270K	MCR10
R414	RESISTOR	47K	MCR10
R415	RESISTOR	47K	MCR10
R416	RESISTOR	47K	MCR10
R417	RESISTOR	47K	MCR10

LOGIC UNIT

REF. NO.	DESCRIPTION	PART NO.	
R418	RESISTOR	22K	MCR10
R419	RESISTOR	22K	MCR10
R421	RESISTOR	100K	MCR10
R422	RESISTOR	100K	MCR10
R423	RESISTOR	1M	MCR10
R424	RESISTOR	100K	MCR10
R425	RESISTOR	15K	MCR10
R426	RESISTOR	6.8K	MCR10
R427	RESISTOR	82K	MCR10
R428	RESISTOR	4.7K	MCR10
R429	RESISTOR	220K	MCR10
R430	RESISTOR	220K	MCR10
C401	MONOLITHIC	470P	GRM40
C402	MONOLITHIC	470P	GRM40
C403	MONOLITHIC	470P	GRM40
C404	CERAMIC	470P	50V
C405	MONOLITHIC	0.1	GRM40 F
C406	MONOLITHIC	0.01	GRM40 F
C407	MONOLITHIC	0.001	GRM40
C408	MONOLITHIC	0.001	GRM40
C409	MONOLITHIC	0.001	GRM40
C410	MONOLITHIC	0.001	GRM40
DS401	LAMP	BQ031-22403A	
DS402	LCD	LP156A-E	
SP401	SPEAKER	40P-157B	
EP401	MICROPHONE	KUC-2023-01-006	
B401	P.C.B.	B-1051D	
B402	F.P.C.	B-813A (LOGIC-MAIN)	

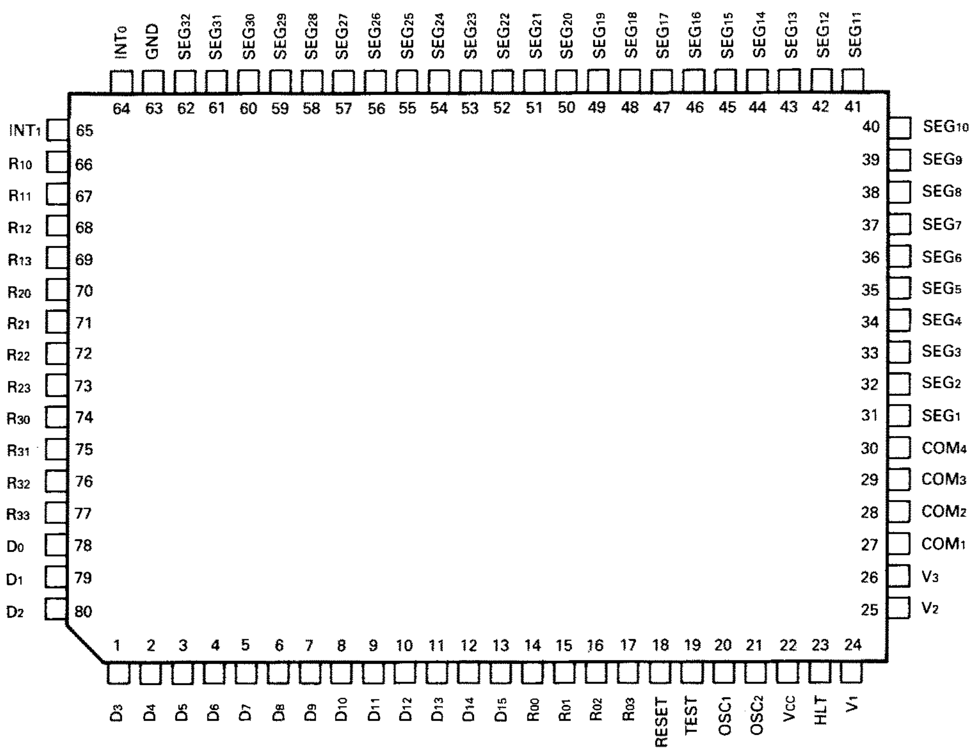
SECTION 11 IC SPECIFICATIONS

HD44795 (MPU)

MAXIMUM RATINGS (Ta = 25°C)

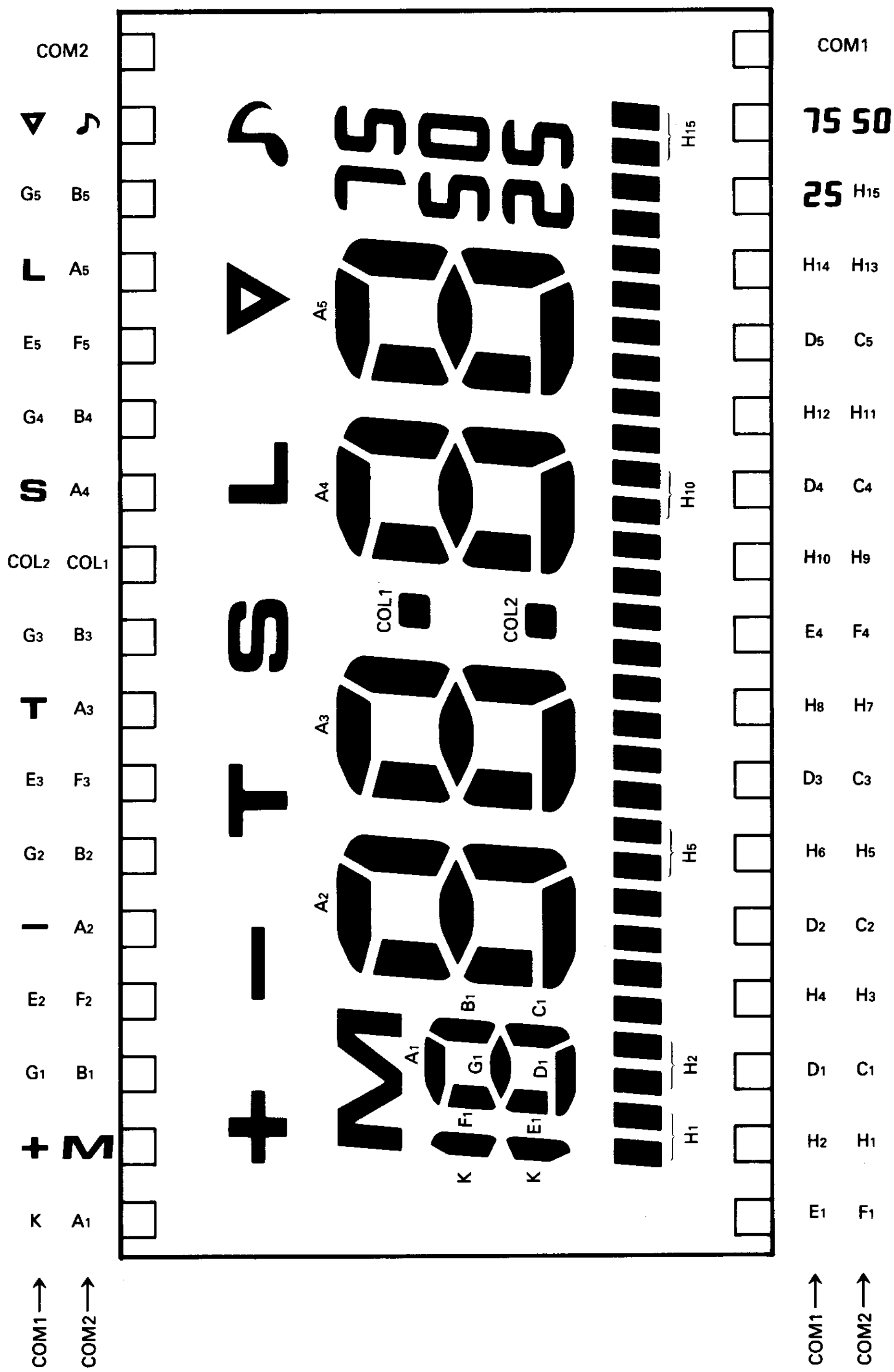
DESCRIPTION	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	−0.3~+7.0	V
Input And Output Voltage	V_T	−0.3~V_{CC}+0.3	V
Total Output Current	I_{OUT}	45	mA
Operating Temperature	T_{OPR}	−20~75	°C
Storage Temperature	T_{STG}	−55~125	°C

PIN CONNECTION



LP165-E-1 (LCD)

PIN CONNECTION

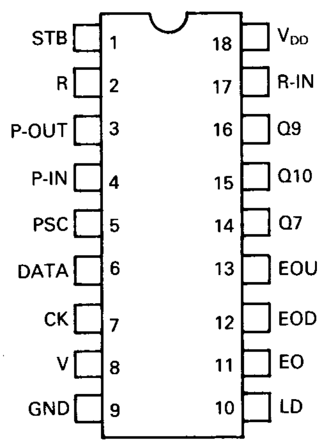


μPD2834C (PLL FREQUENCY SYNTHESIZER)

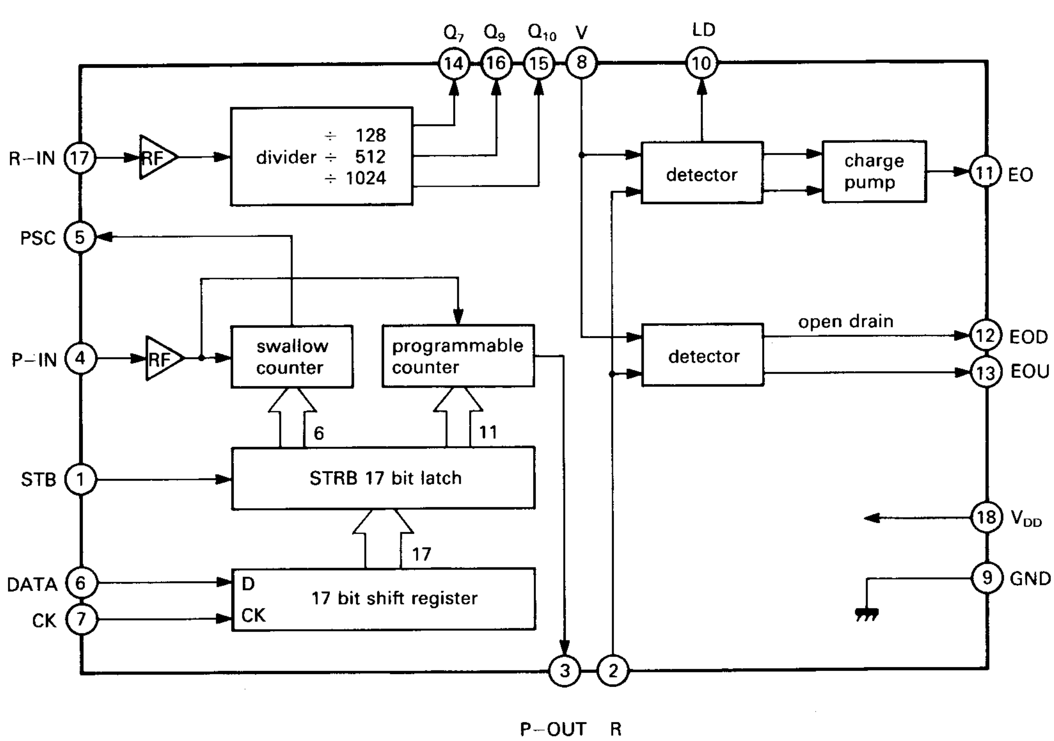
MAXIMUM RATINGS (Ta = 25°C)

DESCRIPTION	SYMBOL	RATINGS	UNIT	REMARKS
Supply Voltage	V_{DD}	−0.3∼+7.0	V	
Input Voltage	V_{IN}	−0.5∼+V_{DD}+0.5	V	
Output Voltage	V_{OUT}	−0.5∼+V_{DD}+0.5	V	
Output Voltage	V_{OUT}	−0.5∼+V_{DD}+3.0	V	EOU pins only
Operating Temperature	T_{OPR}	−40∼+85	°C	
Storage Temperature	T_{STR}	−65∼+150	°C	

PIN CONNECTION



BLOCK DIAGRAM

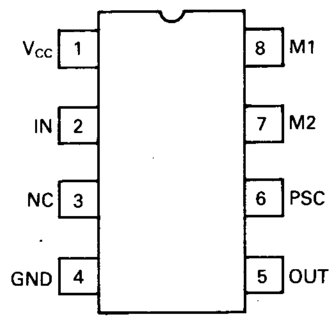


μPB571C (LOW POWER PRESCALER)

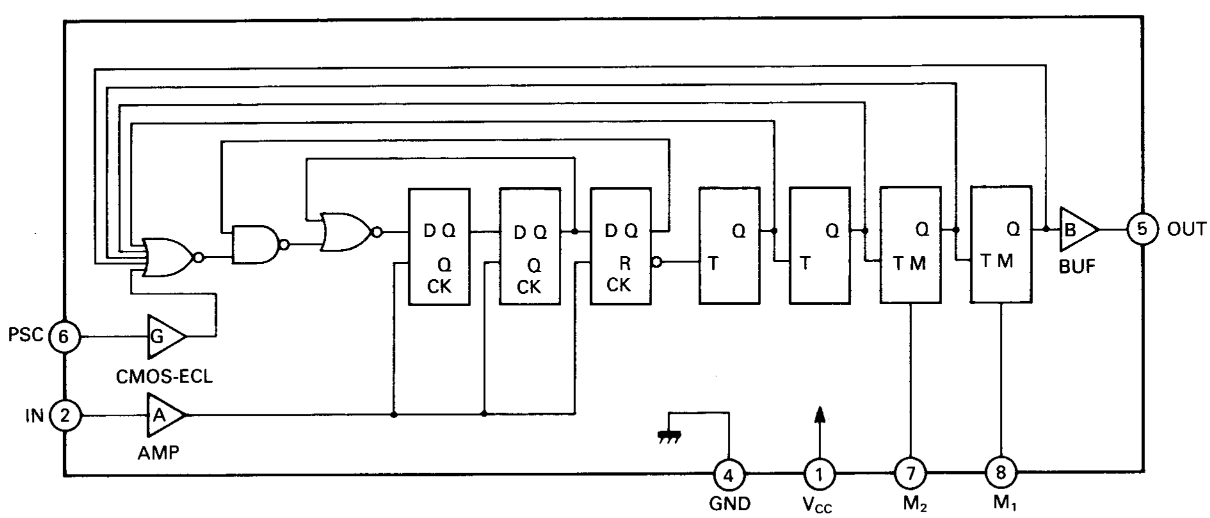
MAXIMUM RATINGS (ta = 25°C)

DESCRIPTION	SYMBOL	RATINGS	UNIT
Supply Voltage (MAX)	V_{CC}	−0.5∼+6.0	V
Input Voltage	V_{IN}	−0.5∼+V_{CC}+0.5	V
Output Current	Io	−10	mA
Storage Temperature	T_{STG}	−55∼+125	°C

PIN CONNECTION



BLOCK DIAGRAM



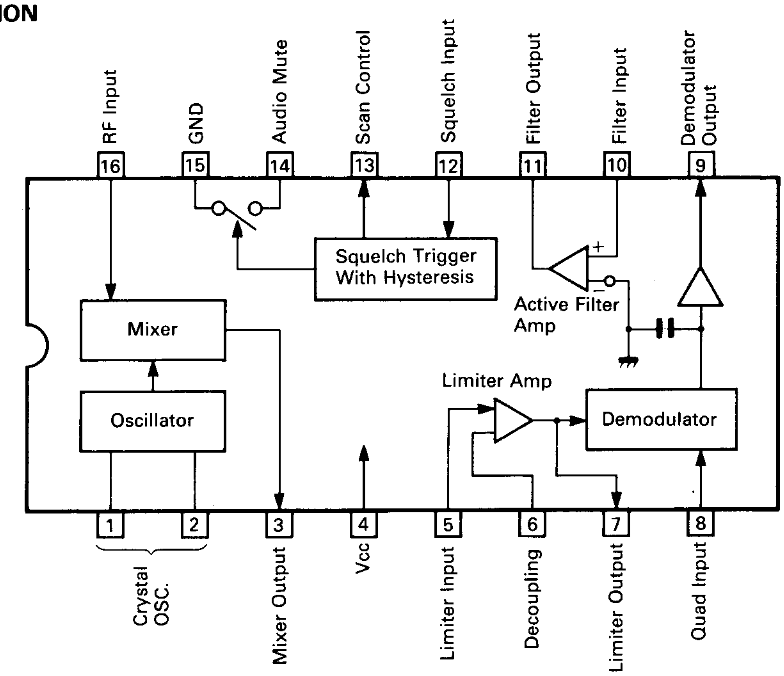
When M1 and M2 are Hi (V_{cc}), FF is equal to buffer.

MC3357 (LOW POWER FM IF)

MAXIMUM RATINGS

DESCRIPTION	SYMBOL	RATINGS	UNIT
Power Supply Voltage	V_{CC} (max)	12	V
Operating Supply Voltage	V_{CC}	4 or 8	V
Detector Input Voltage	—	1.0	Vp-p
Input Voltage ($V_{CC} \geq 6.0$ Volts)	V_{16}	1.0	V_{RMS}
Mute Function	V_{14}	−0.5 ~ 5.0	Vpk
Junction Temperature	T_J	150	°C
Operating Temperature	T_{OPR}	−30 ~ 70	°C
Storage Temperature	T_{STG}	−65 ~ 150	°C

PIN CONNECTION

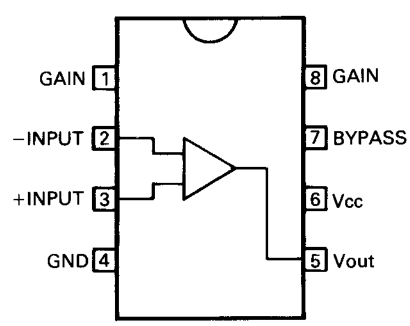


LM386N-3 (LOW VOLTAGE AUDIO POWER AMPLIFIER)

MAXIMUM RATINGS (Ta = 25°C)

DESCRIPTION	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	15	V
Package Dissipation	P_D	600	mW
Drive Input Voltage	DV_{IN}	+0.4	V
Operating Temperature	T_{OPR}	0 ~ 70	°C
Stroage Temperature	T_{STG}	−65 ~ 150	°C

PIN CONNECTION

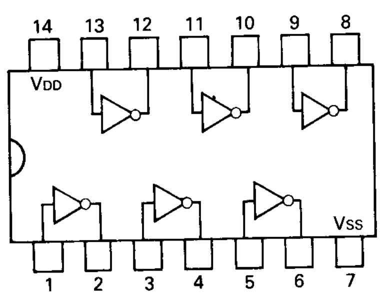


μPD4069UBG (HEX INVERTER)

MAXIMUM RATINGS

DESCRIPTION	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD}	$V_{SS}-0.5\sim V_{SS}+20$	V
Input Voltage	V_{IN}	$V_{SS}-0.5\sim V_{DD}+0.5$	V
Output Voltage	V_{OUT}	$V_{SS}-0.5\sim V_{DD}+0.5$	V
Input Current	I_{IN}	±10	mA
Permissible Dissipation	P_D	300	mW
Storage Temperature	T_{STG}	−65~150	°C

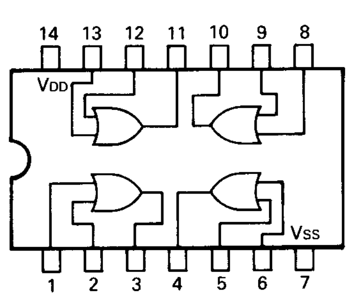
PIN CONNECTION



TC4071BP (QUAD 2 INPUT OR GATE)

MAXIMUM RATINGS (Ta = 25°C)

DESCRIPTION	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{DD}	$V_{SS}-0.5\sim V_{SS}+20$	V
Input And Output Voltage	V_T	$V_{SS}-0.5\sim V_{DD}+0.5$	V
Input Current	I_{IN}	±10	mA
Permissible Dissipation	P_D	300	mW
Storage Temperature	T_{STG}	−65~150	°C



µPC358C (DUAL DRIVER)

MAXIMUM RATINGS (Ta = 25°C)

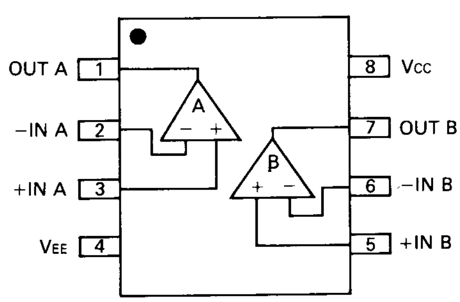
DESCRIPTION	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	32	V
Drive Input Voltage	DV_{IN}	32	V
Input Voltage	V_{IN}	−0.3~32	V
Permissible Dissipation	P_D	350	mW
Operating Temperature	T_{OPR}	0~70	°C
Storage Temperature	T_{STG}	−55~125	°C

LA6393M (DUAL COMPAPARATOR)

MAXIMUM RATINGS (Ta = 25°C)

DESCRIPTION	SYMBOL	RATINGS	UNIT
Supply Voltage	V_{CC}	36	V
Defferencial Input Voltage	V_{ID}	36	V
In-phase Input Voltage	V_{ICM}	−0.3~36	V
Permissible Dissipation	P_D	300	mW
Operating Temperature	T_{OPR}	−30~85	°C
Storage Temperature	T_{STG}	−55~125	°C

µPC358C, LA6393M PIN CONNECTION

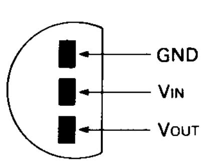


S81250HG (C-MOS VOLTAGE REGULATOR)

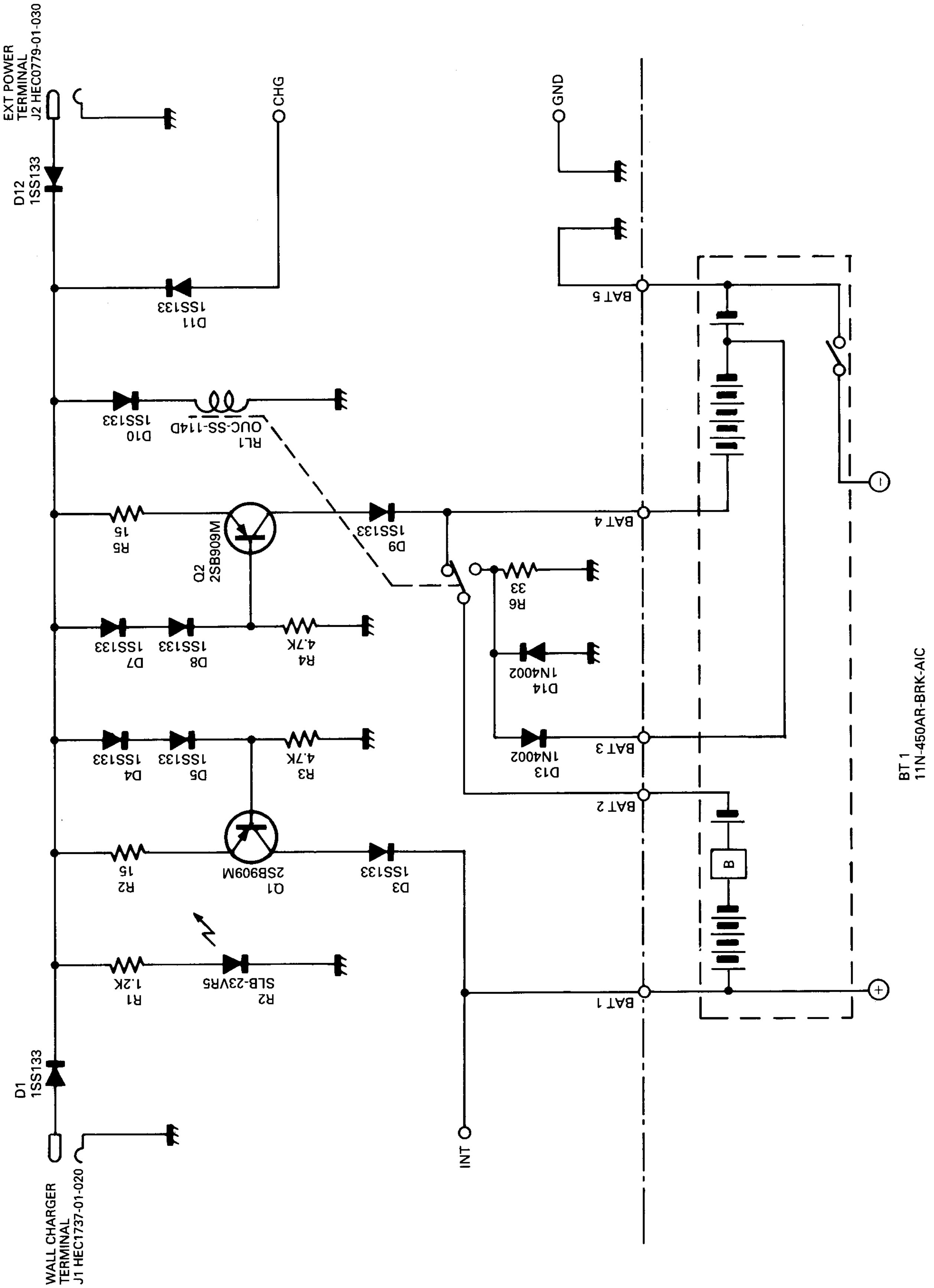
MAXIMUM RATINGS

DESCRIPTION	SYMBOL	RATINGS	UNIT
Input Voltage	V_{IN}	18	V
Output Current	I_{OUT}	100	mA
Permissible Dissipation	P_D	200	mW
Operating Temperature	T_{OPR}	−20~70	°C
Storage Temperature	T_{STG}	−40~125	°C

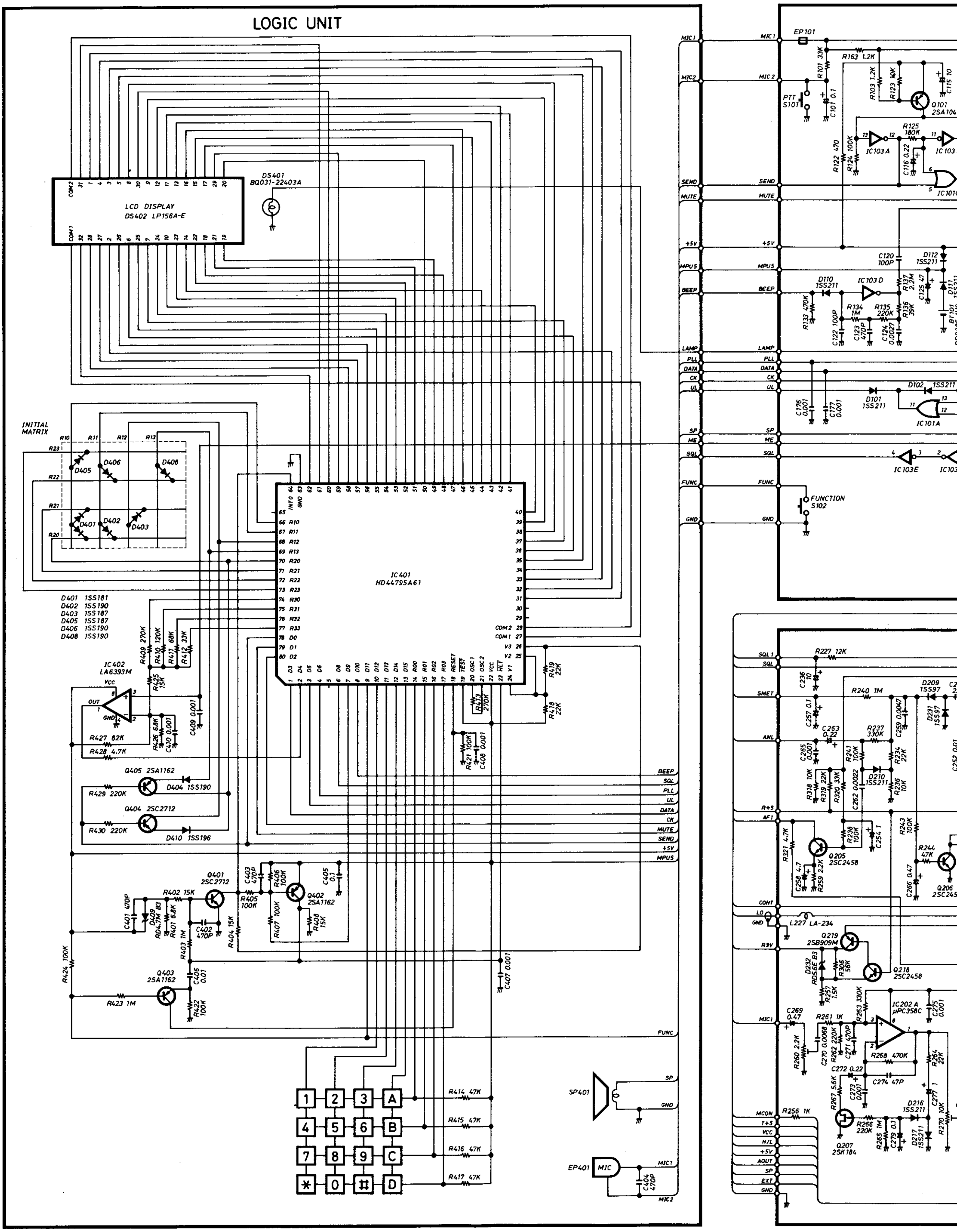
PIN CONNECTION (BOTTOM VIEW)



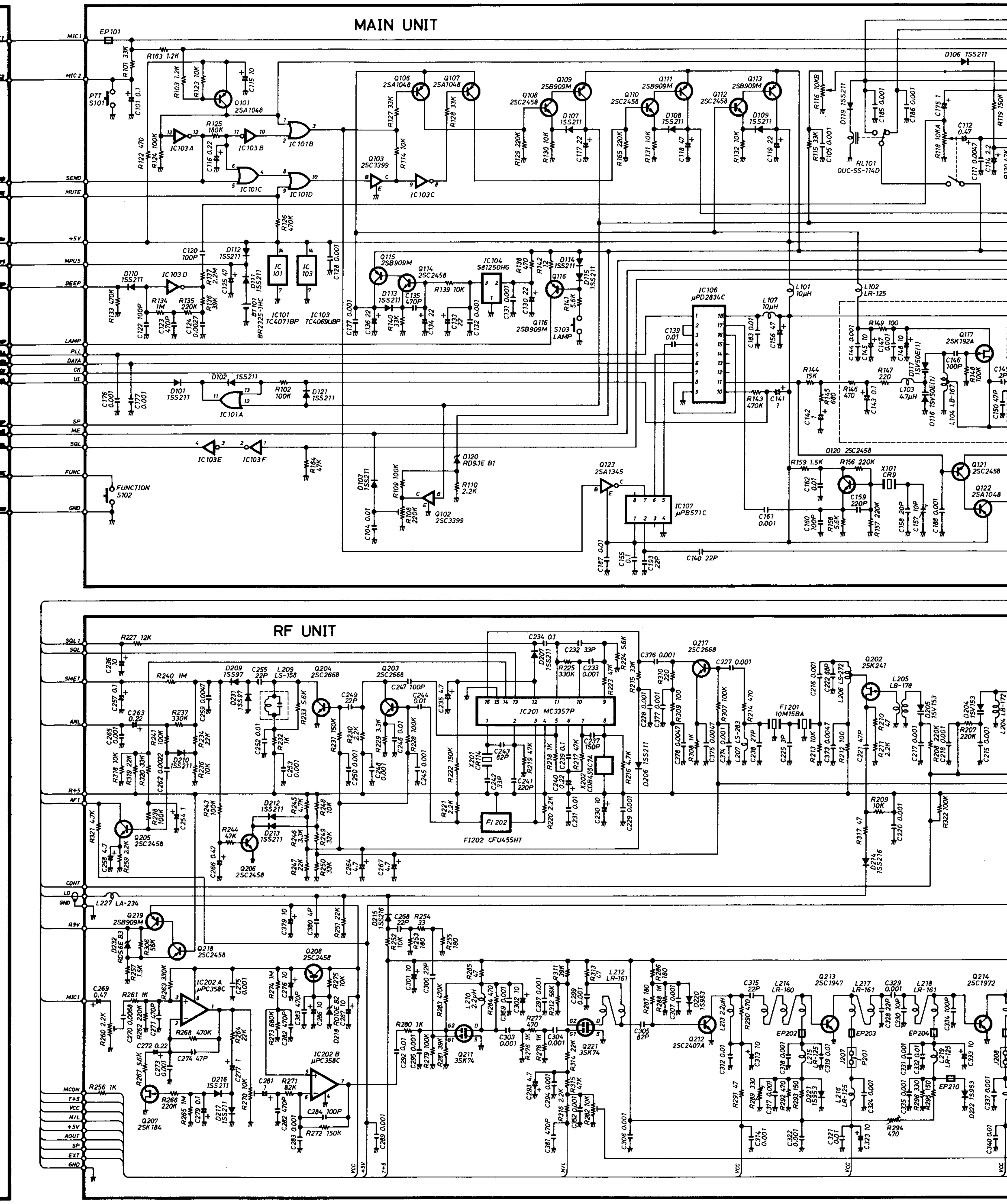
IC-CM7

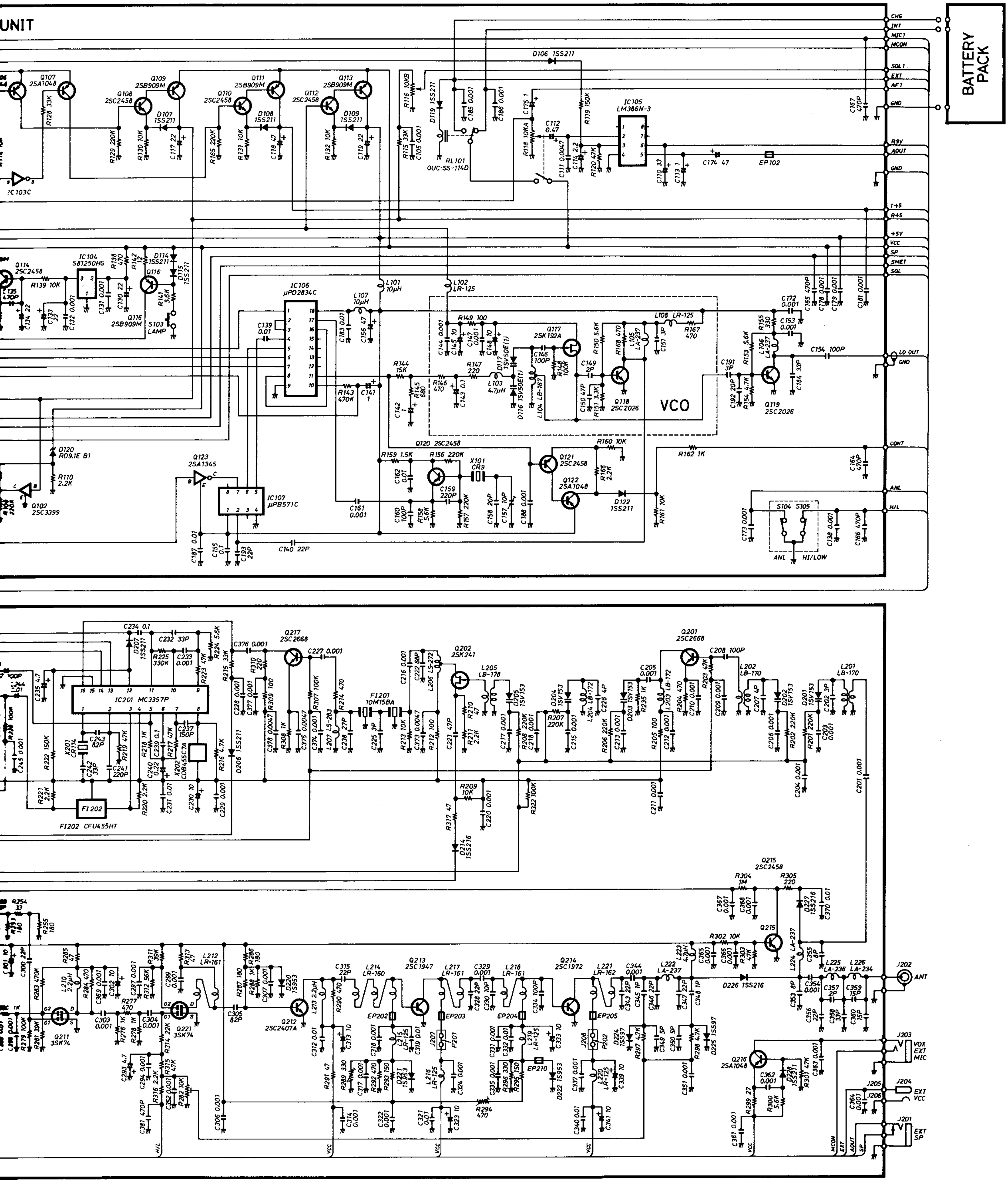

EXT POWER TERMINAL J2 HEC0779-01-030
D12 1SS133
CHG
GND
D11 1SS133
D10 1SS133
RL1 OUC-SS-114D
R5 15
Q2 2SB909M
D9 1SS133
BAT 5
BAT 4
BAT 3
BAT 2
BAT 1
R6 33
D7 1SS133
D8 1SS133
R4 4.7K
D14 1N4002
D4 1SS133
D5 1SS133
R3 4.7K
D13 1N4002
R2 15
Q1 2SB909M
D3 1SS133
B
R1 1.2K
R2 SLB-23VR5
BT 1 11N-450AR-BRK-AIC
D1 1SS133
INT
WALL CHARGER TERMINAL J1 HEC1737-01-020

IC-A2 SCHEMATIC DIAGRAM



IAGRAM




UNIT
BATTERY PACK
VCO
IC105 LM386N-3
IC106 μPD2834C
IC107 μPB571C
IC201 MC3357P
IC104 S81250HG
RL101 OUC-SS-114D
F1202 CFU455HT
ANT
VOX EXT MIC
EXT VCC
EXT SP
ANL HI/LOW